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THE CHANGES IN THE TELEPHONE AND TELEGRAPH RELATIONSHIP

Telephone men are watching with keen interest the extension of teletypewriter service by the Bell System and the telegraph companies, and wondering what effect it will have on the telephone business. The American Telephone & Telegraph Co. is installing teletypewriter exchanges so that customers can write the messages in their offices and send them to their destinations over the telephone lines. Both the telegraph companies—Western Union and Postal—on December 1 opened a similar service.

* * * *

There is promise of lively competition between the telegraph companies and the Bell System, as the former seem to have joined forces to fight the Bell for the business—"if it exists," as President Newcomb Carlton of Western Union says.

Just how this competition will affect the Independent telephone companies remains to be seen. The matter is receiving the careful attention of the United States Independent Telephone Association and will be handled by its executive committee. It is likely a conference with the A. T. & T. officials will be held to discuss the question next month.

During the past year there were definite indications of interesting maneuvers between the telephone and telegraph interests. Many local companies were approached with a proposition to cooperate with the Postal Telegraph-Cable Co. and make contracts to handle its telegraph messages for a certain percentage of the message rate. In some cases, it is said, 50 per cent of the telegraph fee was offered the telephone company.

Not many telephone companies signed up, as the impression prevailed that a telephone company is in the telephone business, not the telegraph business; and, besides, that if any such arrangements were made it would be more to their advantage to hook up with the interests identified with the telephone toll business, namely, the A. T. & T. Co., which had been functioning more with the Western Union—in the telegraph service—than with the Postal.

The teletypewriter development seems to have disrupted this relationship at least to the extent of pushing teletypewriter service, as the Western Union would not agree to the terms of the Bell offer to participate in a nation-wide service and has joined the Postal in a plan to interconnect with their lines. This is acknowledged to mean competition for the teletypewriter business between the two telegraph companies and the Bell System.

* * * *

An interesting question arises in this connection: How much will the extension of teletypewriter service interfere with long distance telephone service? This is considered of vital importance to Independent companies.

It would also seem to be of great importance to the Bell System which derives considerable income from its long lines. (The A. T. & T. report for the year 1930 contains this item: "Toll revenues, $348,541,203"). However, if the Bell chooses to go into the telegraph business, it is assumed its organization has studied the situation and is advised that the teletypewriter development will not cut into its toll receipts to an injurious extent.

Local telephone companies will regard the situation from a different angle, as their revenue from tolls—though small compared to the Bell receipts—is in most cases an important item in their annual income. If local telephone companies decide it will be advantageous to participate in teletypewriter service by furnishing circuits in territory where the Bell—or the telegraph companies—must rely on the local exchanges to handle messages, they must see to it that their compensation covers any loss of toll revenues that might be displaced by the printer service.

In other words, it will be up to the local companies to make contracts that will sufficiently protect themselves.

The telephone associations will fulfill their duty to operating companies only by working to the same end. United, organized work will probably be needed to secure the local companies proper compensation.

* * * *

Under the heading, "A Battle Ensues," an interesting angle of the situation is given by a financial writer in the New York Times, who says:

"The duel between the telephone and telegraph systems of the country over printer business is expected to become

more violent as time goes on, especially as the telegraph interests feel that the printer business is essentially a telegraph enterprise, while telephone officials take the view that as it is their duty to furnish wires to all who may wish to use them, and the telegraph companies are their largest customers, anything which adds to use of their wires is within their province.

Actually, all the telephone company will do is to provide printers for clients and supply switchboards at all main cities providing for a general interconnection of these printers. It will furnish no operators versed in telegraphy, but girls who will make connections just as they do for telephone calls. The work performed by the telegraph companies will be identical in every respect, as they will perform merely a switching operation in handling this type of service.

From the standpoint of the public, the great advantage of this competition will be the cheapness of the services as now offered. The expense per word transmitted will depend solely on the efficiency of the typist employed by the client."

Judging from the foregoing quotation, if the public is to be saved money it will mean a reduction of revenues that heretofore have gone to the telegraph companies.

Some observers in the telephone industry are not surprised to see the A. T. & T. Co. enter the field of telegraph operations, as they recall that 20 years ago the Bell owned a controlling interest in the Western Union. December 19, 1913, the A. T. & T. Co. wrote a letter to the Attorney General of the United States agreeing to dispose of its interests in that company in order to conform to the federal government's policy against monopoly as defined in the anti-trust laws.

The anti-trust laws, however, do not prohibit interconnection of the Bell and the Independent toll lines; and there is no reason to believe that they make illegal the interconnection of telephone and telegraph systems—as has been claimed by some—to enable subscribers of the teletypewriter service of the Bell System to obtain connections with subscribers of the teletypewriter service of the telegraph companies.

So long as the systems are not in a single ownership, interconnection of their lines will not conflict with the anti-trust laws. The action of the Bell System in entering the telegraph field is likewise not in violation of these laws.

Inasmuch as there is considerable agitation in certain business quarters just now to modify the anti-trust laws, some think, if changes are made, they might permit the Bell again owning a telegraph system. So far as known, however, the Bell interests have not joined in the demand for revision of the anti-trust laws. Most of the agitation for modification comes from oil concerns and other corporations connected with natural resources who wish to combine and limit their production.

COMING CONVENTIONS.

Minnesota Telephone Association, Radisson Hotel, Minneapolis, January 26, 27 and 28.

Nebraska Telephone Association, Hotel Paxton, Omaha, February 9, 10 and 11.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, February 24, 25 and 26.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 12, 13 and 14.

Kansas Telephone Association, Jayhawk Hotel, Topeka, April 19, 20 and 21.

Handling Toll Traffic With the Dial

Detailed Explanation of Features of Dial Operation of Long Distance Circuits—Sequence of Diagrams Illustrates Expansion from Simple to Complex Systems—Presented Before Traffic Conference at Recent National Convention

By E. L. Gaines,

Traffic Superintendent, Home Telephone & Telegraph Co., Ft. Wayne, Ind.

The rapid development of dial telephone equipment during recent years together with the successful use of the dial telephone by large operating companies for rendering local service, has caused operating telephone men and manufacturers alike to give much thought to the possibilities of dial operation of long distance circuits.

It seems timely, therefore, that one should undertake to summarize such advantages and disadvantages of dial equipment applied to toll networks as seem apparent with the present stage of development of the art, and endeavor to visualize the complete possibilities of such applications in order that today's developments and extensions may be directed towards some ideal ultimate toll dialing network.

Fig. 1. Simplest Example of Arrangement Toll Dialing—Manual to Dial Office.

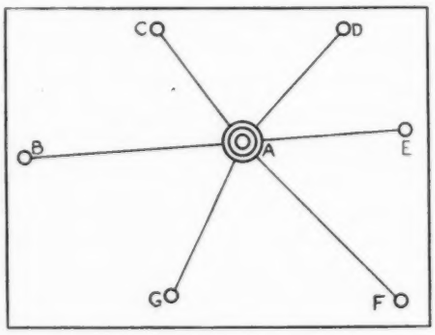


Fig. 2. Several Manual Offices May Dial Into Same Automatic Office.

The idea of toll dialing is not new. As early as 1915 Indianapolis, Ind., toll operators dialed Columbus, Ohio, subscribers direct; and Columbus toll operators in turn dialed Indianapolis subscribers over Independent toll lines. A considerable toll dial network connected many dial exchanges in Indiana and Ohio at this early date.

Numerous toll boards in manual offices were equipped with dials for completing toll calls to automatic exchanges. As an example of this practice the toll operators in the manual exchange at Fort Wayne dialed subscribers in the automatic offices in Indianapolis, South Bend, Richmond, Ind., Dayton and Columbus, Ohio.

Such early efforts at toll dialing were not without their limitations, but operation was successful and clearly demonstrated the possibilities of the general scheme. The advantages of the plan consisted mainly of speed of service and economy of operating and circuit time. The originating operator called the desired subscriber in the distant office without the intervention of through or inward operators.

Old-time toll practices interfered with the complete success of early efforts at

Fig. 3. Typical Arrangement for Dialing Between Two Toll Dial Offices.

toll dialing. Among these were the old two-ticket method of operating, barred, or denied toll lists and a lack of present combined line and recording methods. Toll lines which were in poor condition inter-

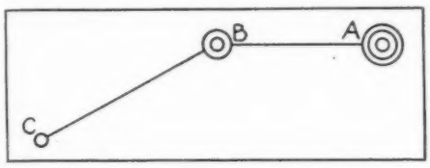


Fig. 4. Two Dial Offices May Be Reached from the Same Manual Office.

fered with dial operation. Eventually these handicaps, coupled with the sale to competing companies of properties in the network, largely eliminated toll dialing in the Indiana and Ohio territory.

During the past few years numerous applications of toll dialing have been made in all parts of the world to suit various local conditions. These installations are rendering good service and are effecting substantial savings for the operating companies.

The first, and perhaps simplest example of toll dialing, is a dial office connected by toll circuits with a manually-operated office. This arrangement is shown in Fig. 1. The toll board in the manual office is equipped with dials and all toll calls to the dial office are completed by the operators in the manual office. The operators in the manual office may either ring the toll operators in the dial office for through calls to points beyond the dial office or dial subscribers in the dial office direct, as desired. Where there is sufficient traffic to justify such an arrangement the circuits may be made one way only.

In either case the toll circuit is terminated on the toll train switches in the dial office. It is terminated in the regular manner on the manual board which is also dial equipped. The operators in the manual office call direct to the information operators in the dial offices for directory service.

The advantages of this type of toll dialing consist of the complete elimination of inward operating in the dial office, the speeding up of operation at the manual office, instantaneous disconnect at the dial office, complete control of the entire connection by one operator, the ability of the operator at the manual office to make a second call instantly and the resultant increased toll circuit load capacity due to decreased circuit holding time.

Several manual offices may be equipped to dial into the same automatic office as is shown by Fig. 2. With such an arrangement a manual office may call any other manual office direct through the automatic office without the assistance of through operators.

Another typical toll dialing arrangement now in extensive use is the combination of two dial exchanges so connected with toll lines that all toll operating in both exchanges is performed by operators at one point. The subscribers of both exchanges reach the same group of toll operators over recording trunks. This arrangement is shown in Fig. 3.

The trunks between exchanges are two-way trunks and are used by the toll operator to complete calls to the distant exchange as well as to receive, record and complete calls from it. It is usual in such cases to group all manual services such as information, repair and long distance for both exchanges, in one office, thus gaining the greater efficiency of a larger operating group and decreasing operating costs proportionately.

Neighboring manual offices may be arranged to dial toll calls to both offices as shown at *C* in Fig. 4. Fig. 5 shows a number of manual offices tributary to the dial

"At the Present Stage of Development of the Art," Says Mr. Gaines, "There Seems to Be No Limit to the Size of a Toll Dialing Network."

offices. In this case a manual office tributary to one of the dial offices may dial through either or both dial offices to another manual office without the assistance of through operators in either dial office.

In a network of this character it is frequently found desirable to have subscribers at the unattended office, *B*, dial direct to the tributary manual offices, *C*, *D* and *E*. Special numbers are listed in the subscriber's directories and subscribers are instructed to dial these special numbers for calls to these points. The operators at *C*, *D* and *E*, upon receiving calls from subscribers at *B*, make originating tickets of the calls and complete the calls. The tickets are then mailed to the general office of the exchange at *B*, for collection and accounting purposes.

This plan avoids tying up toll circuits between *B* and *A*, when completing calls from *B* to *C*, *D* or *E*.

In operation, this network eliminates all operating at *B* and all inward and through operating at *A*. It greatly speeds all toll service within the network as only one operator is required on a call of any kind. Instantaneous release of toll circuits, together with the elimination of inward and through operating, increases the circuit capacity by decreasing working and holding time.

Another arrangement of offices and toll circuits frequently used is the tandem plan, an example of which is illustrated in Fig. 6. In this arrangement toll operators are located at a dial office, *A*. An unattended dial office, *B*, is connected to *A* by direct toll circuits in the usual manner. Another unattended dial office, *C*, is connected in tandem with office *B*. The subscribers at office *C*, dial through office *B* to office *A*, where the call comes in on the long distance switchboard.

Manual offices, as shown at *D*, may be connected by direct toll dialing circuits to offices *A*, *B*, or *C*. The toll operators in such manual offices may dial direct to subscribers in all three manual exchanges.

This arrangement requires but one operator on any toll call within the network. It is particularly efficient in toll circuit operation as it allows all circuits between two offices to be used as a common group for all classes of calls, circuit selection being made automatically from either end in any predetermined order. A call from *A* to *D* would require the use of three circuits in tandem—*AB*, *BC* and *CD*. These same circuits would also be used for handling calls between adjacent offices, for example, the circuit, *AB*, might handle a call from office *A*, to office *B*, while the circuit, *BC*, handled a call between offices *B* and *C*.

Where traffic in a tandem system is heavy the saving in circuits resulting from the use of larger circuit groups is material. The saving resulting from dialing on tandem circuits is especially large because of the rapidity with which the connection is set up and the instantaneous disconnect.

With the tandem arrangement shown in Fig. 6, a special number may be assigned

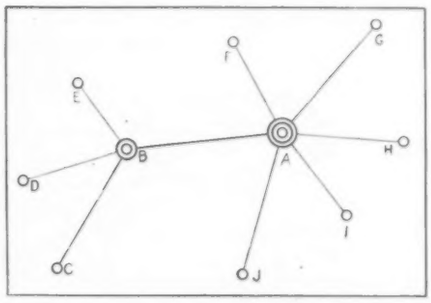


Fig. 5. Several Manual Offices Can Reach Either of Dial Offices Direct.

for the manual office, *D*, and the subscribers at *A*, *B* and *C* allowed to dial the toll operator at *D* direct, for calls to the *D* office. In this case the operator at office *D* would make an originating ticket and supervise the call.

Several toll dialing networks have recently been set up in which a group of offices have been converted to dial operation and all long distance and special service operating, such as information and repair, centralized at one office, usually the one most centrally located to the group. Such a network is illustrated by Fig. 7, in which office *A* is the operating center

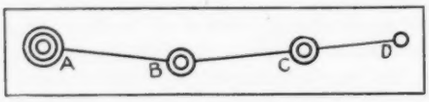


Fig. 6. Tandem Arrangement. Toll Operator at D Can Be Dialed from A, B or C.

and *B*, *C*, *D*, *E*, *F* and *G* are unattended dial offices. The dial equipment may be so arranged that all subscribers dial the same predetermined special number for the long distance operator.

If the toll circuits at office *A* are terminated on selectors, special numbers may be assigned also to Information, Repair and the Telephone Company, so these special services may be dialed direct by the subscriber without the necessity of going through a switching operator. Such an arrangement is not advisable if the combined traffic of the entire group can be handled by a single group of one or two operators.

Where separate groups of operators are needed for Information, Repair and Long Distance, as is the case in all but the smallest systems, it is best to arrange for subscribers to dial direct to each of the separate service boards.

Increased efficiency of toll operating forces results from centralizing all operators at one point. The force may be more readily adjusted to the load and is usually better trained and supervised than where only a few operators handle the entire traffic load in a small office.

The arrangement shown in Fig. 7 usually develops into the network shown in Fig. 8, where one or more neighboring manual offices are connected to each of the unattended dial offices by toll dialing circuits. It is frequently possible thus to connect all tributary offices in a district to the toll center of the district, which, in this case, would be office *A*. Here again special numbers may be assigned for the manual offices and subscribers in the unattended offices allowed to dial direct to the manual offices tributary to their exchanges. The resultant saving in actual operating labor in the network shown in Fig. 8, is as follows:

1. All outward operating at offices *B*, *C*, *D*, *E*, *F* and *G*.
2. All through operating at offices *A*, *B*, *C*, *D*, *E*, *F* and *G*.
3. All inward operating at offices *A*, *B*, *C*, *D*, *E*, *F* and *G*.
4. A decrease in working time in outward operating in all offices where operators are located. This network may be set up in such a manner that it will be necessary to dial only three digits for any office to reach any other office in the network.

Figs. 9 and 10 illustrate actual operating networks of the type shown in Fig. 8. Fig. 9 is a diagram of the toll dialing network of the Clinton Telephone Co. of Wilmington, Ohio.

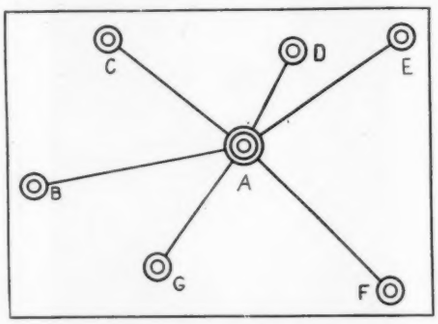


Fig. 7. Network Having Long Distance and Special Service Operating Centralized at One Office.

All toll operating for the five unattended offices and the dial office at Wilmington is concentrated on the Wilmington long distance board. Wilmington is the toll center of the district. Toll circuits to other toll centers are omitted from the drawings for

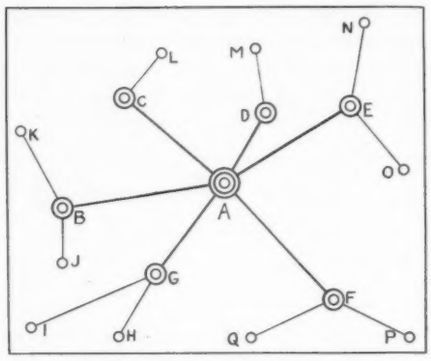


Fig. 8. Further Development of Toll Network Shown in Fig. 7.

clearness. Some of the unattended offices are of the semi-automatic type and some are part semi-automatic and part full automatic.

Fig. 10 represents the toll dialing network of the Home Telephone & Telegraph Co. at Fort Wayne, Ind. Fort Wayne is the toll center of the district in which the network is located. It is surrounded by seven unattended dial offices, the toll and special service operating for all being handled in Fort Wayne. Thirteen manual offices have switchboards dial-equipped for dialing into the network. The unattended office at Kimmell is operating from the manual office at Albion, which is in another toll center district.

Subscribers in the unattended dial offices surrounding Fort Wayne are listed in the Fort Wayne suburban directory. The toll to and from these points is handled at special suburban toll positions in the Fort Wayne office by the two-number method. A special number, "0" is assigned the suburban board and another special number "110," is assigned for calling long distance. This division of the toll into short-haul, two-number, dial-operated calls and regular long-haul long distance traffic makes it possible to give almost instantaneous service on suburban calls and to operate this low rate business at a profit.

Where two adjacent toll centers are surrounded by dialing networks similar to

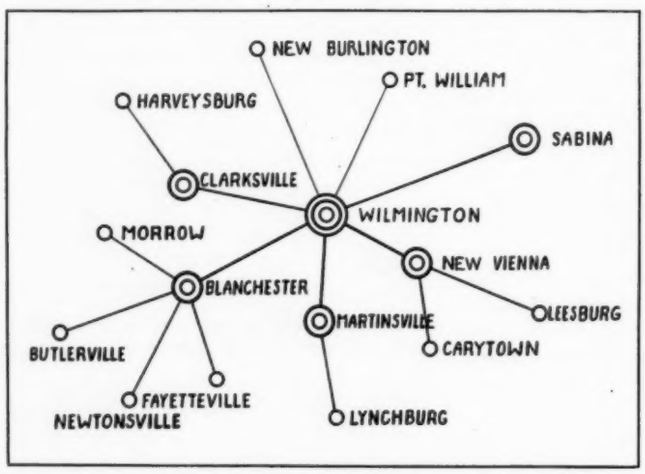


Fig. 9. Actual Operating Toll Dialing Network of the Clinton Telephone Co., of Wilmington, Ohio—

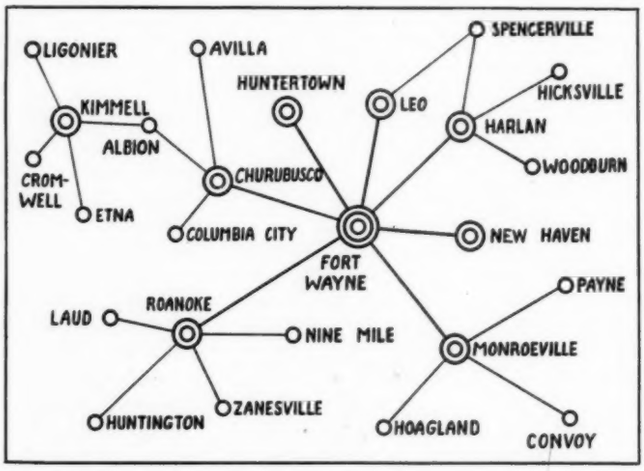


Fig. 10. The Toll Dialing Network of the Home Telephone & Telegraph Co. at Fort Wayne, Ind.

Fig. 8, they may be connected by dial trunks as shown in Fig. 11, and operated as a single network. Under this plan any office in the network may dial any other office by using a four-digit number without a prefix.

Three adjacent toll centers with their tributary networks are illustrated in Fig. 12 with direct trunks between all three centers. The arrangement of the trunks on the toll selector levels at the toll centers is also shown in Fig. 12.

As in the arrangement shown in Fig. 11, only four-digit dialing is required for the three toll center network. In fact, this is true of any number of groups up to eight.

A theoretical trunking plan between toll centers of an eight-toll center network is shown in Fig. 13. Each toll center is provided with direct trunks to each of the seven other toll centers. This arrangement will also allow four-digit dialing unless some office has more than ten direct circuit tributary offices, in which case an extra digit will be required to reach certain ones.

At the present stage of development of the art there seems to be no limit to the size of a toll dialing network. The possibilities seem as great as in local dial systems. It is easily conceivable that a network be built up covering the entire United States and Canada which would enable any toll operator in any exchange to dial direct to any exchange in the network.

The use of the traffic director principle will make it possible to issue a toll directory of exchanges, listing call numbers for each and every exchange in the network. The originating toll center operator in such a network would dial the number of the distant office, then the number of the subscriber station wanted, if a dial office. If the called point were a manual office the subscriber station would be requested of the operator after the office is reached.

For complete dial networks each toll center would furnish toll information service for all tributary exchanges in the district and a universal number would be assigned for such service.

The speed and efficiency of such a system makes it seem advisable to install small quantities of toll switches in manual offices when such offices are so located as to make such installations useful for through dialing purposes.

The advantages gained and the savings made in a large toll dialing network are as great as in local work. Calls are properly routed automatically; given first, second and third alternate routings without the possibility of an error and without time wasted securing routing instructions.

The higher efficiency of larger circuit groups is gained by grouping all circuits between two points on selectors and using them for all types of calls. The greater speed of setting up a call, especially on built-up circuits, and the instantaneous disconnect, save as much as 20 per cent of the circuit time in many cases.

Increased speed and accuracy of service means increased use of the service and increased revenue. All factors in a toll dialing network point towards increased revenue and decreased operating expense.

Many problems have been met in working out toll dialing to its present high degree of efficiency. Doubtless many more will be met and solved as the plan is placed in more general use. One of the first difficulties encountered was the matter of transmission. Transmission difficulties were overcome at an early stage in the development of dial equipment. Today, dial toll circuits and switching equipment may have lower losses than manual.

A number of problems have been presented by the dial circuit itself. High induced voltages causing inductive disturbances on long lines, attenuation, or the smoothing out of the dial impulses, the interference of ringing current on the line, were all encountered and solved. One of the last to present its appearance and be solved was the interference with radio reception caused by dialing.

Perhaps the greatest of all toll dialing problems engineers have had to exert their genius to solve was the difficulty of preserving the complete use of phantom, simplex, composite and carrier current facilities, where toll dialing was used.

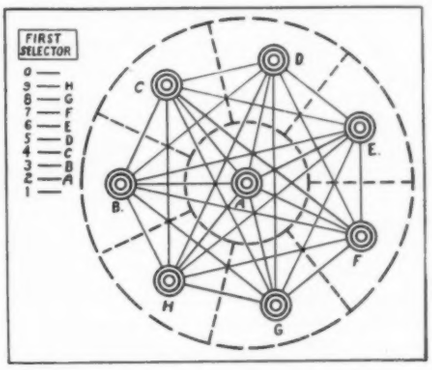
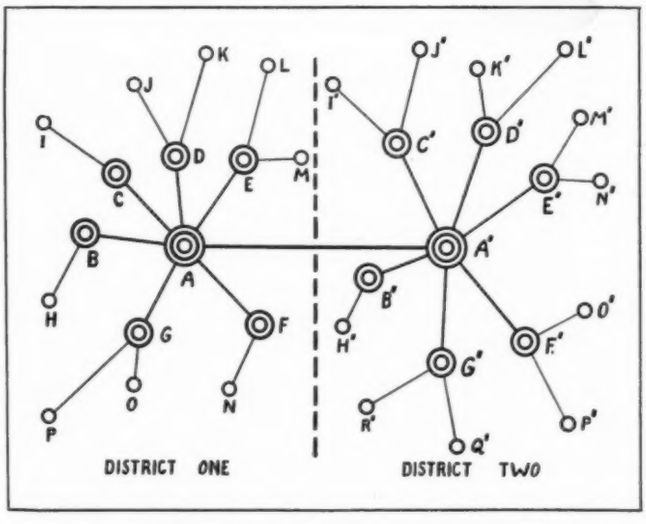


Fig. 13. Theoretical Trunking Plan Between Toll Centers of an Eight-Toll Center Network.

The elimination of such facilities and their complete replacement with physical wire lines is too expensive to be considered for any but the shortest circuits. Research work along this line has brought out a number of successful ways of overcoming such difficulties inexpensively and the future of toll dialing on a large scale seems now assured.

The adoption of toll dialing brings to the subscriber a speed and accuracy of service which is foreign to him, even in this day of remarkably fast toll service and which will inevitably draw a larger use of the long distance service from the subscriber and increase the earnings of the telephone operating company. This increase in earnings together with substantial savings in operation represents an increase in net earnings that may not be well overlooked by any company operating long distance lines.



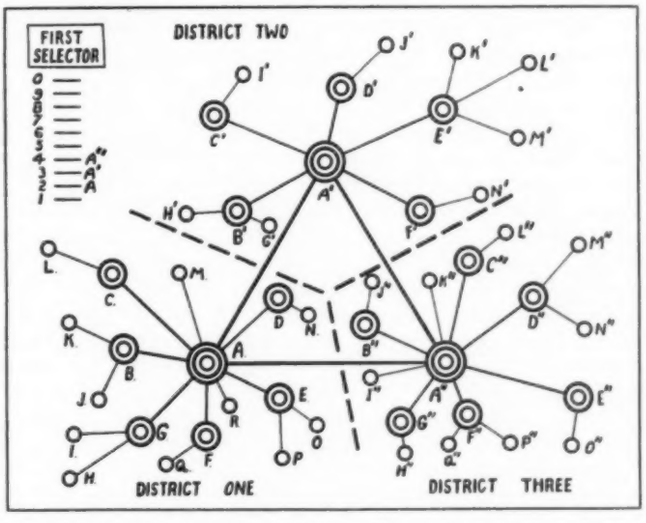


Fig. 11. The Dialing Networks of Two Adjacent Toll Centers May Be Connected by Dial Trunks Without Much Difficulty and Operated as One Network—Fig. 12. Three Adjacent Toll Centers May Also Be Joined to Operate as One Network.

The Relation of Radio to Telephony

Importance of Radio Developments to Better Telephone Communications Explained at Recent National Independent Telephone Convention — Research Leading to Improved Reproduction in Broadcast Receivers Affects Telephone Manufacture

By Ray H. Manson,

Vice-President and Chief Engineer, Stromberg-Carlson Telephone Mfg. Co.

Today, everyone is interested in radio broadcasting from the entertainment standpoint. The majority of people listening to radio, also are subscribers to telephone service, but only a handful of this big group of people realize that the high quality of present telephone service is due primarily to the three-element vacuum tube and other radio developments.

Prior to 1915, it was not possible to carry on telephone conversation across the United States from the Atlantic to the Pacific Coast. The three-element vacuum tube, built up around the designs submitted to the Bell Telephone Laboratories by Dr. Lee De Forest in October, 1912, was mainly responsible for bridging the United States with commercial telephone service.

All of us know of the more recent developments of radio which allow conversations to be carried on from our offices and homes to offices and homes in foreign countries. Thus, through the use of radio and the vacuum tube, telephony has improved in quality and has extended its commercial service to all parts of the world.

Both the A. T. & T. Co. and the Bell Telephone Laboratories have recognized from the start the importance of radio in the improvement of telephone technique, and the extending of the service to larger territories.

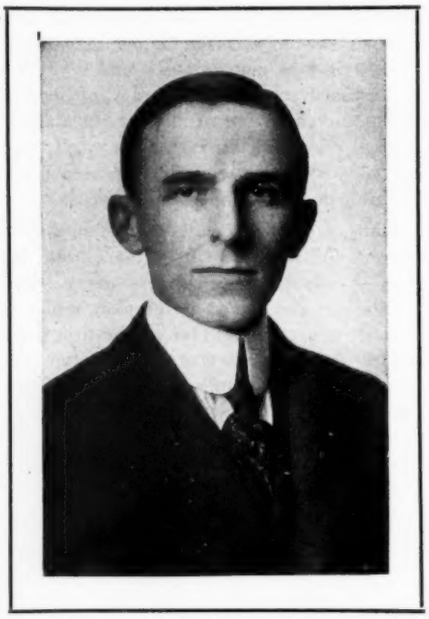
In the Independent field, the company with which I am connected, early recognized the importance of radio in connection with telephony. Ten years before broadcasting was made commercial and three years before the vacuum tube telephone repeater was introduced into the telephone circuits of the Bell company, this organization manufactured and marketed radio headsets for amateurs and commercial operators.

This early start in radio stimulated development of improved audio systems and loudspeakers, and through these researches notable improvements have been made in standard types of telephone equipment.

Radio, also has benefited by its close relationship to telephony by incorporating many of the design details which had been developed through long experience in manufacturing telephone equipment for the exacting requirements of public service corporations.

The close relationship of radio to telephony and vice versa is best comprehended when we reduce the two systems to that of general principles. In both radio and telephony, the complete system is nothing more than an electro-acoustic transmission network in which sounds are transmitted by electrical means.

In the telephone system, sounds (speech) are converted into electrical currents at the telephone transmitter, and these currents are carried by wires to the telephone receiver at the distant end of the circuit where they are turned back into sound.



"The Successful Handling of Radio Design and Manufacturing Problems," Says Mr. Manson, "Has Been Productive of Outstanding Improvements in the Telephone Products."

In the radio broadcasting, the sole function of the entire system is to transfer sounds from one place to another, but in this case the system is more complicated, as one portion of the connecting link between the broadcast station microphone and the loudspeaker at the receiving end is through space, without any wires to guide the electric currents.

In the case of telephony, wire circuits control the exact destination of the sounds, whereas in radio, the transmission through space makes it impossible to control the exact destination of the sound and as a consequence, any number of listeners can "tune in" to the broadcast signal and reproduce the transmitted sounds in their homes.

Until the advent of radio broadcasting, there was no commercial demand on the telephone companies for what is now known as "high quality telephone circuits," such as are now used in network radio programs.

This was due mainly to the fact that the designers of telephone apparatus and telephone circuits were more concerned in getting intelligibility of speech than in obtaining complete naturalness of reproduction. Also, the regular telephone circuits are intended for the transmission of voice only and the range of audio frequencies required for commercial conversations are relatively short as compared to the range of audio frequencies required for the transmission of vocal and instrumental music.

These high quality radio program circuits were first designed to pass audio frequencies from about 100 cycles per second (approximately one octave below middle "C" on the musical scale) to 5,000 cycles per second, which is somewhat higher than the fundamental frequency of the highest pitched note on the piano scale. In commercial telephone circuits, which carry speech only, a much shorter range of from about 250 cycles to about 2,750 cycles has been considered satisfactory.

The demand for better audio quality on the part of radio broadcasting has recently brought about still further improvements in high quality telephone circuits for radio use. Special circuits in the recently-installed New York-Chicago cable allow a flat response extending from approximately 40 cycles to 8,000 cycles. With this telephone circuit improvement, the transmitting end of a radio broadcasting system, now are capable of giving a high quality of transmission which will reproduce faithfully and with a high degree of naturalness vocal and instrumental music, all kinds of speaking voices, and odd noises which do not come under the heading of music or speech.

Again, it is seen that through the demands of radio broadcasting not only have the telephone circuits been greatly improved from the quality transmission standpoint, as well as long distance coverage, but the details of the design of all of the apparatus entering into these circuits have likewise been vastly improved over that required in telephone circuits prior to the advent of radio.

Inasmuch as both telephony and radio deal with sound, it is natural to expect

that much research has been done in telephone laboratories on this most important subject. For example, in the Stromberg-Carlson laboratories, acoustical research has been going on for many years. A special sound room and special testing instruments have been devised for carrying on this research work, and original outdoor measurements have been conducted as a check on the inside laboratory tests.

The data accumulated through a long period of experience in these acoustical laboratories have resulted in determining the principles involved in the reproduction of sound in the commercial types of broadcast receivers and have resulted in the increasing of the audio range, as well as the smoothing out of the reproduction, so as to avoid resonant peaks and other disturbing elements.

It is not out of place to mention here a few semi-technical facts on sound systems which will explain some of the problems of the acoustical engineer.

For example, resonance is that property of a vibrating system which enables it to be readily set into motion at its *natural frequency*. A sharply-tuned resonant system will vibrate vigorously when excited by a relatively small force having the same frequency as that of the system, but will respond only slightly to the same force at other frequencies. Resonance may occur in mechanical, electrical or acoustic systems.

An example of mechanical resonance at a very low frequency is the familiar playground swing, which may easily be set into regular motion only by timing the pushes so that they occur in step with the natural period of the swing.

Resonance in an electrical system is illustrated by the behavior of the tuned circuits in a radio receiver, whose natural frequency may be adjusted to respond only to that of a desired broadcast station.

Acoustic resonance may occur in a partially-closed air chamber, such as the space behind a loudspeaker in a radio cabinet. In such a case, a reproduced tone whose frequency corresponds to the natural frequency of the enclosed mass of air, will be exaggerated in loudness.

There are two types of distortions produced by resonant systems, as follows:

(a) Frequency distortion, because of the exaggeration of frequencies falling at or near the natural frequency of the system.

(b) Transient effects. These may occur when the system is driven forcibly by signals of a frequency other than its natural frequency. Suppose a short pulse of such a signal be admitted to the system. The system first vibrates a few times at its own natural frequency, these vibrations being superimposed on those forced by the driving frequency. Then it settles down to response to the driving frequency only.

When the signal stops, however, the system continues to vibrate momentarily at its own natural frequency. These "start and stop transients" particularly affect rapidly changing signals, such as speech and music, and produce a type of distortion which is very difficult to measure instrumentally.

The foregoing discussion indicates why resonance should be avoided in the sound frequency range of electro-acoustic transmission systems.

While in telephony an audio frequency range of about 300 to 3,000 cycles is satisfactory for recognization of speech sounds, complete naturalness is lacking, due to the preponderance of high frequencies, compared to the available low frequencies.

The ideal range for speech naturalness and intelligibility would be approximately 90 to 5,000 cycles. This happens to be the outside audio range limits for the majority of radio receivers now in use. Reproduction of frequencies above 5,000 cycles, in the present broadcast system set-up, is productive of disturbing elements which detract from the program.

The lower limit of the audio range is dependent on several controlling factors, one of which is the baffle area presented by the radio receiver cabinet which houses the modern type of electrodynamic speaker.

A baffle is nothing more than a partition for preventing circulation of air between the two sides of a loudspeaker diaphragm. The air must alternately be *compressed* and *rarefied* in order to initiate sound waves in it. In order to do either of these things it is necessary to confine or restrain, in some manner, the air immediately adjacent to the diaphragm.

Consider a diaphragm without a baffle. If the vibrations of the diaphragm are very rapid, as when producing a relatively high-pitched note, the inertia of the air itself, due to its definite mass, will cause it to resist the motion of the diaphragm sufficiently to produce compression.

Now, suppose the diaphragm to vibrate at a slow rate, as when producing a deep bass note. Consider its forward motion. The air has time, in this case, to move bodily and to slip around the edge of the diaphragm to the rear side to take the place of that which has tended to follow the diaphragm forward. The air thus merely evades the thrust of the diaphragm and is not compressed, with the result that no sound is radiated.

Now, imagine the baffle to be put in place. The air can no longer find a short and easy path between the sides of the diaphragm; in order for it to flow from one side to the other it would have to pass out to the edge of the baffle and back on the other side, which would involve the motion of a large mass of air. The greater inertia of this larger mass causes it to resist even the slower motion of the diaphragm sufficiently to be compressed and to produce sound.

The larger the baffle, the lower the frequency which can be reproduced. This follows from the foregoing discussion, the slower vibrations corresponding to the lower frequencies requiring a greater mass of air to resist the diaphragm motion in order that the inertia may be great enough to allow compression to take place. This requires a larger baffle to restrain a larger mass of air from moving freely.

In the modern radio receiver, the enclosing cabinet serves as a box type baffle, and while it is not as good in some respects as a flat baffle, it can be scientifically designed to give excellent audio reproduction when fitted with a correctly-designed loudspeaker unit.

Recent acoustical laboratory studies show that the front area of the cabinet is of greater importance in the smooth reproduction of the lower audio frequencies than the length of circulation path, as applied to box type baffles. The box type baffle introduces acoustical resonance which tends to exaggerate a short range of sound frequencies and produce what is popularly known as "rain barrel effect." This requires special treatment to remedy, such as leaving the back and bottom of the cabinet open.

Now as to the low frequency cut-off produced by commercial forms of radio cabinets: Laboratory tests show that some of the small "midget" type cabinets omit all fundamental frequencies below middle "C" on the musical scale, and that the largest console cabinets cut off at about 60 cycles. Thus, the larger the cabinet, the greater the possibilities of true low frequency response.

It is fortunate that the human ear is so constituted that the audio range now practical from the broadcast system standpoint, is adequate for satisfactory reproduction of both speech and music with a high degree of naturalness.

This research for better ways and means for obtaining higher quality of reproduction in radio broadcast receivers has taught telephone engineers how to improve the apparatus entering into the transmission of speech in telephone circuits.

Furthermore, the solving of the problems involved in the production of high quality radio equipment has resulted in the introduction of more advanced manufacturing methods and the inauguration of

Growth of Individuals and the Organization.

The continued growth of each individual means a better and better organization which will constantly improve the high standards of our service to others, in which it is our privilege to participate.

Our daily contacts, one with another, present an opportunity to be of service to each other in so conducting ourselves that the best in each of us comes daily to the foreground as a natural, normal development.—N. R. Powley, Vice-President, Pacific Telephone & Telegraph Co.

more complete and exacting tests for quality than have been considered necessary for straight telephone production.

In telephony, the same as in radio, the main object is to transmit sounds from one location to another with a *high degree of fidelity*. The public has but little interest in the mechanism and circuits employed in connecting the transmitting and receiving points, so long as telephone connections are made quickly and maintained without interruption.

This prompts the statement that the type of telephone instrument, the type of telephone switchboard and in fact, the design details of the intercommunicating apparatus which have to do with signaling and switching, are of secondary importance from the standpoint of the telephone subscriber.

As a fitting conclusion to this statement regarding the relation of radio to telephony, it is not out of place to repeat that the design and manufacture of radio equipment in telephone factories has resulted in marked improvement also in the design of the telephone equipment made in those same factories. Thus, instead of being a diverting influence in a telephone manufacturing organization, the successful handling of radio design and manufacturing problems has been productive of outstanding improvements in the telephone products.

British-American Group Gets Contract for Poland's Telephones.

The Polish parliament has passed the necessary laws for granting a contract to Telephone & General Trust, Ltd., of London, England, in conjunction with its affiliated company, the Associated Telephone & Telegraph Co., of Chicago, Ill., for conversion of the state-operated telephone system of Poland to the Strowger automatic system, it was announced last week by E. C. Blomeyer, president of Associated Telephone & Telegraph Co. with executive offices in Chicago.

The contract provides for the furnishing of supplies and granting of an international credit of more than $3,000,000 in a revolving arrangement over a period of 12 years by the British-American group.

Payments under the contract, which are specified in United States gold dollars, are secured by the Polish telephone system revenues and are unconditionally guaranteed by the Polish government. The British-American group knows from inspection, that the telephone system revenues are more than adequate to support the purchases to be made.

The Associated-General telephone group undertakes outside the United States, engineering, construction, management and operation of, and the installation, examination, negotiation and acquisition of telephone systems, and the financing of the operating properties for extensions to existing plants. The interests sponsoring the Associated-General telephone group are said to either directly or through subsidiaries, control and operate more telephones than any other privately-owned company with the exception of the Bell System in America.

In alliance with British associates the group has substantial holdings in properties valued at more than $91,000,000 in the United States, Canada, England, India, Australia, Belgium, Portugal, Venezuela and other countries.

The Strowger system of automatic telephony as now adopted by the Polish state is the standard system in use in government and private systems of North and South America, Great Britain, Germany, Australia, Japan and other important countries. Nearly 75 per cent of the automatic telephones in use throughout the world operate under this system.

The initial contract for construction and installation of automatic equipment for the immense telephone network in Greater London which is now in progress, was awarded to the Automatic Telephone Mfg. Co., Ltd., of Liverpool, one of the companies of the Associated-General telephone group.

Iowa Changes Annual Convention Dates from April to February.

The Iowa Independent Telephone Association for a great many years has held its annual convention in April, but is going to try a winter convention. The board of directors has just decided to hold the 1932 convention in February. The dates selected are February 24, 25 and 26. The convention will be held at the Fort Des Moines Hotel, Des Moines, Iowa.

Chas. C. Deering, of Des Moines, is secretary of the association. Special efforts will be made to provide an attractive program of general interest to all.

What Operators Want to Know

Questions Continue to Be Popular—Ninety-Five Questions Submitted in Recent State Convention Traffic School—New Phrases and Changes in Operating Make Work More Interesting

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

That telephone operators in Illinois are interested in their work is indicated by the increasing number of written questions that are submitted in our district meeting and state convention traffic schools. At our recent state convention in Peoria, Ill., 95 written questions were submitted.

One manager, whose operators submitted quite a number of written questions, asked: "Does this mean that my operators are not well posted in their work?"

"No, Mr. Manager, on the contrary, it is the best indication you can have that your operators are interested in their work and sincere in their search for knowledge that will enable them to render a higher quality of service to your customers."

Simple things and things not frequently used are most confusing. How often, in writing a letter, are we confused and bothered over the spelling of some very simple word. We spell it over in our mind and perhaps write it two or three times and still it does not look right. Or it may be a word we do not use frequently and for that reason we have forgotten how to spell it.

Everyone who has worked at a switchboard for any length of time is sure to have encountered frequent cases where she has been confused about the proper handling of a call, or a condition not frequently encountered.

We have opportunities to learn something new almost every day in every line of work, and this is particularly true of telephone work. Perhaps that is why we find our work so fascinating. We receive new phrases and changes in operating methods frequently enough to keep us interested in our work and constantly on our toes.

In the larger offices, where service observations are taken, we are given an objective to meet; and if we meet this objective for a number of successsive months it is very likely that we will find our objective moved up a notch. This is as it should be. If we would meet our objective month in and month out, and our objective would not be raised, we would soon become disinterested in our work and would lose our incentive to keep on improving.

So chief operators, do not get discouraged when you are given a higher objective to meet. Keep up your spirits and step on it and you will find that your new objective is not the bugaboo you thought it would be.

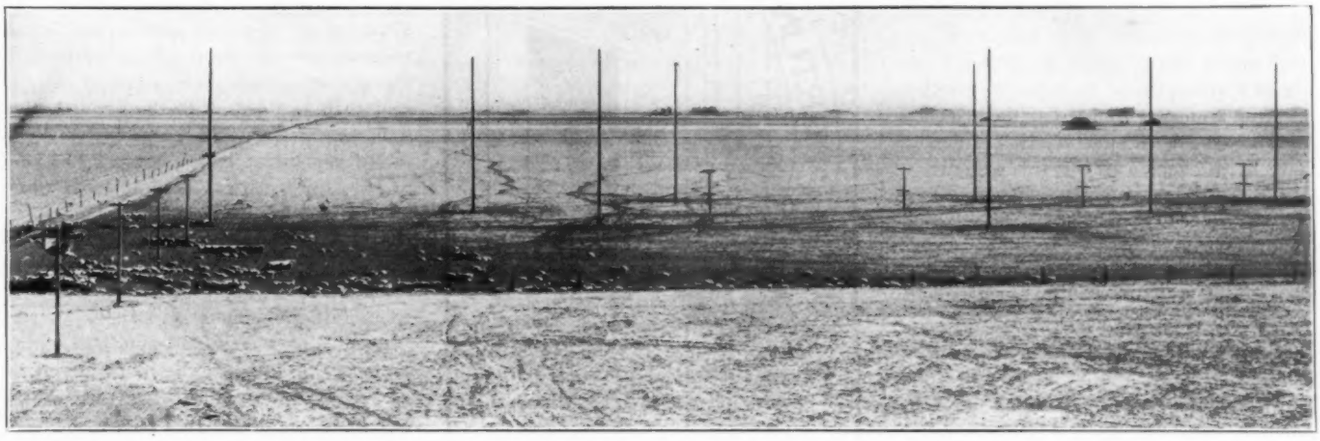
Questions from Illinois Operators.

1. What should the Inward operator do if a call is passed by address name?
2. How long should we hold the subscriber on the line on a CLR call?
3. Who is responsible for the accuracy of the peg count?
4. What do you say to your party when you have asked the TTC to "change connection and ring called number?"
5. When do we enter "rec'd" only in the Special Instruction space?

For answers to these questions from real Illinois operators, turn to page 25.

Transpacific Telephone Service to Hawaii

Radio-Telephone Communication Facilities Will Soon Add the Hawaiin Islands to the World-Wide Network—Simplicity of Design and Construction Are Important Features of the Transmitting and Receiving Stations in California



Double-V Antenna as Seen from Building at Dixon, Calif. Pole Line at Left Comes from Transmitter. The Tallest Pole at Left and the Pole at Extreme Right Are on a Line Pointing to Hawaii in Order to Obtain Highest Transmission.

Telephone communication with Hawaii is expected to be opened within the next few weeks. The buildings in the United States for the service have been completed, and engineers have made preliminary tests of equipment at the short wave radio transmitting center at Dixon, Calif.

These tests were in progress for about two months, being concluded in late October. System tests are now being made with the radio stations on the Hawiian end of the circuit. Most of the receiving equipment has been installed at Point Reyes, Calif., and practically all local tests have been made.

The Transpacific Communication Co., Ltd., a subsidiary of the American Telephone & Telegraph Co. and the American operating company for Hawaiian service, has selected San Francisco as the location for the terminal control center. There, in the Pacific company's Grant avenue toll building, is installed the Hawaiian board, through which all calls between North America and the Hawaiian Islands will pass. Transcontinental calls and calls to Europe, are now handled here.

This center will occupy the same position in the new service that the terminal control center in New York City does in transatlantic, South American, and ship-to-shore services. There will be installed such equipment as that for volume control, monitoring and testing, vodas, delay, privacy and their associated testing and power supply panels. The switchboard, itself, will be connected with the receiver at Point Reyes and the transmitter at Dixon.

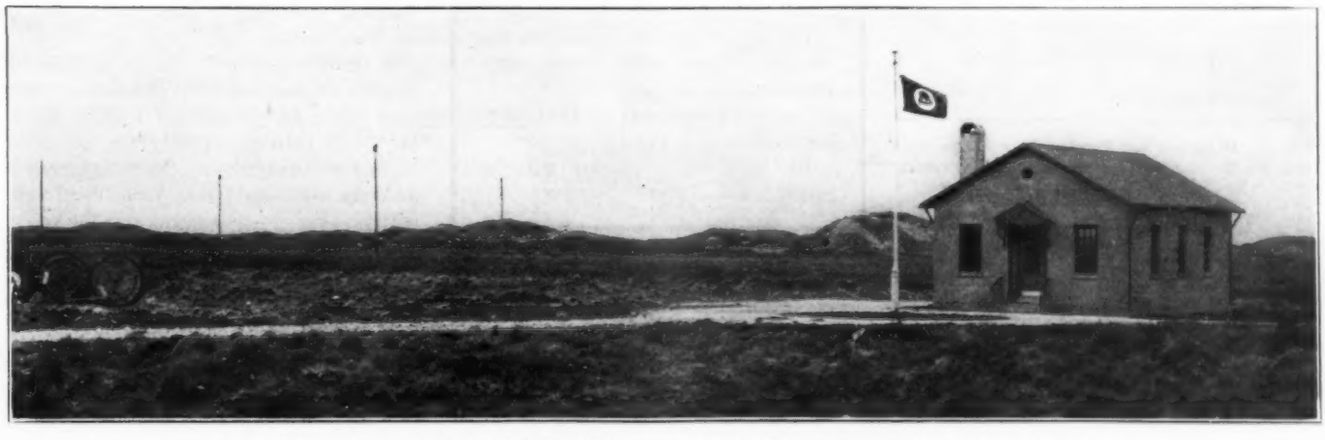
Simplicity and compactness mark the new type antennas at these points. They are diamond-shaped, and the arrangement of wires, as shown in the accompanying illustration, makes them highly directional. That is, they are pointed directly at Hawaii and this results in great power economy.

The diamond at Dixon is formed by two copper wires mounted on eight 70-foot poles. The diamond is about 500 feet long and 250 feet wide. At the western end of the antenna is a system of 1,200 feet of iron wire looped back and forth on a line of four 20-foot poles.

The resistance of the iron wire causes the eastward waves to die out. The shape of the antenna prevents northern and southern radiations. The double-V antenna system is thus unidirectional; that is, transmits in only one direction.

At Point Reyes, the receiving center for Hawaiian service, the building lies very near the waterfront in an almost secluded section of the California seacoast. This lack of outside interference is considered an important aid in good radio reception. The building has room for several radio receivers and their associated equipment, although at first there will be but one installed.

The Radio Corp. of America will operate the stations in the Hawaiian Islands. The transmitting point will be near Kakuku Point, on the Island of Oahu, about 30 miles from Honolulu. The receiving station will be near Koko Head, on the same island, about 12 miles from Honolulu.



Receiving Station at Point Reyes, Calif., for Transpacific Telephone Calls from Hawaii.

Here and There in Telephone Work

More Convenient Method of Payment of Telephone Bills Offered.

The 55,000 subscribers in the Columbus, Ohio, area of the Ohio Bell Telephone Co. have been offered a more convenient plan for paying their telephone bills. Under the new arrangement the subscriber authorizes the company to present the telephone bill for payment each month on the due date to the bank carrying his account.

The bank, under the agreement, will pay the bill properly endorsed by the telephone company and the receipted statement will be retained by the bank and presented to subscribers with their check account statements and cancelled checks.

While this system is not new in operation, this is the first time the company has offered the plan to its subscribers generally. For several years between 2,000 and 3,000 telephone customers have been paying their bills under the system, it is said.

Total charges for long distance service are included in the bill when presented to the bank. In cases of complaints as to the amount of the bill, the company says that any adjustment due will be made willingly even though the bill has been paid. There will be no extra charges for the service, it was announced.

P. B. X. Current Supply; Charging the Battery from Central Office.

By John A. Bracken.

In order to charge the P. B. X. storage battery by means of the central office storage battery, the positive pole of the P. B. X. battery must be connected in opposition to the positive pole of the central office battery. As the P. B. X. battery possesses an E. M. F. of a certain amount it will, therefore, neutralize the E. M. F. of the central office battery; that

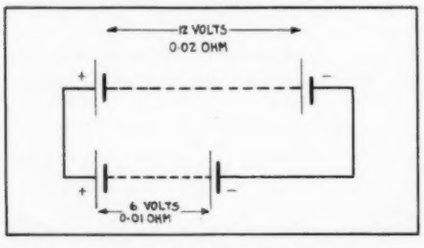


Fig. 1. Diagram for Explanation of Charging P. B. X. Battery from Central Office Storage Battery.

is, the central office battery having a higher E. M. F. will set up a charging current through the P. B. X. battery in opposition to its E. M. F.

For example: If the central office battery stands at 24 volts and the P. B. X. battery stands at 16 volts, the difference between voltage of the two batteries, or 8 volts, is available to set up the charging current.

This may be further explained by an example shown in Figs. 1 and 2. Suppose that a 12-volt storage battery is connected direct to a 6-volt storage battery, positive pole (+) to positive pole (+) and negative pole (—) to negative pole (—) as in Fig. 1, what would the E. M. F. be?

The resultant E. M. F. impressed on the circuit would be 6 volts in the direction of the 12-volt battery and in opposition to the direction of the 6-volt battery, and in consequence thereof the 6-volt battery will be charged at 6 volts. The value of the current that would flow to the 6-volt battery will depend upon the electrical resistance of the connecting wires, internal resistance of the 6-volt battery, and internal resistance of the 12-volt battery.

To find the value of the current flowing it will be necessary first to find the ohms resistance of the 6-volt battery. By connecting an ammeter switch, variable rheostat and a voltmeter into the circuit as in Fig. 2 and on open circuit test of the 6-volt battery, we will assume that it tests 6.25 volts with the voltmeter connected across the positive (+) and negative (—) terminals of the battery with the switch, *S*, open. The battery is then discharged by closing the switch, *S*, and adjusting the rheostat to produce a discharge of, say, 302 amperes and the E. M. F. of the battery drops to 2.98 volts. Thus at a 302-ampere discharge the E. M. F. has dropped

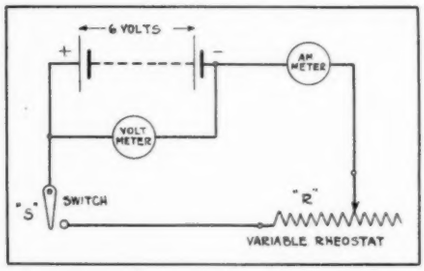


Fig. 2. Connections for Demonstrating Method of Finding Internal Resistance of Storage Battery.

from 6.2 to 2.98 volts, or a drop of 3.27 volts. (These values are used only as an illustration.)

The ohms resistance of the 6-volt battery would then equal the volts drop divided by amperes; that is, $R = E/I$ or $3.27/302 = 0.0108$ ohm, or about 0.01 of an ohm.

It is now assumed, for the purpose of further explanation, that the ohms resistance of the 12-volt battery is twice that of the 6-volt battery, or 0.02 ohm. In order to find the quantity of electric current in amperes that would flow from the 12-volt battery (Fig. 1) and neglecting the resistance of the connecting wires, connections, etc., which is negligible, $I = \frac{E}{r_2 + r_1}$ or $6/(0.01 + 0.02) = 6/.03 = 200$ amperes.

In these examples it has been assumed that the internal resistance of a storage battery while being charged is the same as

OPPORTUNITY

By "Buck."

They say that opportunity knocks only once at each man's door; that therefore we had orta be prepared, fer she won't knock no more.

Now, it is fine to be prepared. We learnt that lesson in the war, when bugles blew an' trumpets blared. To be prepared was better for us all than if we'd slept along. Denyin' that, I'd be a dunce!

But, say, by gum! I think they're wrong when they say that it's only once that opportunity will knock. That kinda talk jus' doesn't check with our experience. Take stock an' ten to one you'll find, by heck, that in your own experience, the knock of opportunity in yore own door has made some dents, not one or two or maybe three, but many more.

But that's not all: As through this world yore way you wend, do you respond when she does call an' reco'nize her as yore friend? Or do you let 'er knock an' knock, an' think yore door she'll batter in? In that case she should knock yore block right off an' sock you on the chin!

It's up to you to reco'nize the knocks. Yore ears you've gotta prime.

She knocks but once? That takes the prize!

By heck, she's knockin' all the time!

its internal resistance while being discharged. This is not strictly true.

Figs. 3 and 4 represent an arrangement for charging a P. B. X. battery from the central office over cable conductors. The non-inductive resistance units are designed and inserted into the charging circuit for the purpose of keeping the current flowing into the P. B. X. battery down to a safe value in case the rheostat resistance is accidentally cut out.

The non-inductive resistances are arranged to be strapped out of the circuit whenever it may be considered necessary in order to increase the quantity of current to the P. B. X. battery. The rheostat can be adjusted to control the value of the current from time to time in accordance with the amount of charge in the P. B. X. battery as indicated by the position the pilot balls in the cells. The rheostat is adjusted by the repairman upon visiting the P. B. X. switchboard.

The same amount of charging current can be maintained at the P. B. X. battery with 24 volts as with 48 volts, provided a certain amount of resistance is taken from the charging circuit.

Thus: $I = E/R$; or 48 volts divided by 100 ohms (non-inductive resistance) plus 50 ohms (non-inductive resistance) plus 20 ohms (cut in the rheostat) plus 30 ohms (in cable conductors) or $48/200 = 0.240$ ampere. By strapping out the 100-ohm non-inductive resistance and leaving the remainder of the resistance in the circuit, we have $24/100 = 0.240$ ampere, the same as for the 48 volts.

Statement Insert Plan in Use by United Companies.

The United Telephone Co., Abilene, Kans., has inaugurated the statement insert plan for creating among its rural subscribers a feeling of satisfaction with their telephone service. In accompanying illustration is reproduced the first two inserts of a series that the company plans to use every month this winter. One of these inserts is enclosed with each telephone bill sent to a rural subscriber.

The United companies are distributing about 25,000 of these inserts each month to rural subscribers, it is stated. They feel that the short messages to the customers are of great advantage in stressing the value of rural service.

"It Always Calls Me!"

"That 'it' is our telephone. You know the girls living in town see one another often and know about parties and things. Out here on the farm I would miss most of them if we didn't have a telephone. I don't though. My friends call me up about everything. My folks wouldn't even consider not having a telephone."

"Nothing Like It!"

"We really get our money's worth out of the telephone at our house. It takes us to town in a few seconds any time we call. You know a few miles in a few seconds is fast enough for our needs. Almost every farm home in our township has a telephone. There's nothing like it to help us be neighborly."

Employes of Lincoln, Neb., Company Aid State's Needy People.

Employe representatives of the Lincoln Telephone & Telegraph Co. met in Lincoln, Neb., on November and voted unanimously to abandon all plans for their annual Christmas parties held each year for the employes, their wives and families.

It was also voted to take the money ordinarily used for these annual events and send it to Governor Charles Bryan's state relief fund committee as the employes' contribution to aid needy and destitute families in the drought stricken areas in northeastern Nebraska.

Definite plans were also worked out by this group to collect from all employes at each of the company's 137 exchanges in southeastern Nebraska, clothing, bedding, canned goods and other supplies to aid the needy in this drought area.

According to J. H. Agee, general manager of the Lincoln Telephone & Telegraph Co., these relief supplies will be sent to the various district telephone offices and brought to Lincoln in the company's trucks. There they will be turned over to W. H. Smith, state tax commissioner, who is in charge of the distribution of supplies and funds for the governor's committee.

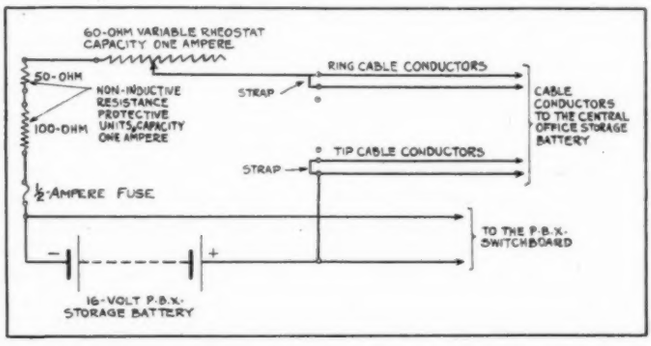
"Makin' Poles Safe" for the Whole Gang and Public.

By Jake The Lineman.

How'dy Buddies! How be they goin' today?

That sure is swell, and I hope yer keep on feelin' pert, nigh good enuf to whip yer hull weight in wild cats, any time.

The other night I was readin' where a feller named Horace Mann once said:



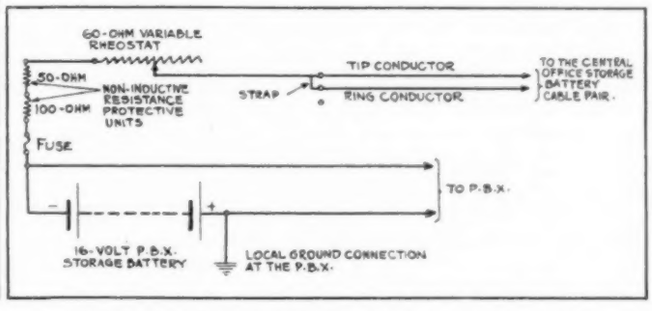


Fig. 3. Arrangement for Charging a P. B. X. Battery from the Central Office Over Cable Conductors, Metallic Circuit. Fig. 4. Arrangement for Charging with Ground Return Circuits.

"Habit is a cable; we weave a thread of it every day, and at last we cannot break it."

Well, I got ter thinkin' 'bout what he'd said, and I up an' decided that if you and I would only make "Safety First" a habit, and weave it around our work—our pleasure—why, Buddy, perty soon we'd have woven a habit of bein' safe that'd be perty hard to break.

After I decided that it'd be best for everyone if we'd make "Safety First" a habit, I jist up an' wrote down a few iron threads of "Safety" which we are going to use in our plays that week.

Every time we climb a pole or even mess aroun' a bunch of poles, "Ole Man Accident" is hoverin' 'roun ready to score, but here are a few points which, if we follow, will set him back for a loss:

Never stand under a pole which is bein' raised. Even a stone head will burst if a 45-footer ever comes a'scootin' down on it.

Only use peavies, cant-hooks, ropes, chains, and tackles you have thoroughly inspected. It's a lot better ter inspect equipment than to be inspected fer an injury.

Always keep clear of poles suspended from tackle or rollin' down skids. You wouldn't stan' a'gawkin' roun' in front of a moving train, would yer? Well, a rollin' or fallin' pole is dern nigh as dangerous.

Carefully test your strap each time before you use it. A bruised apple caint be sold, fer people only want good ones. The same thing fits us humans. A bad fall might put you out of commission fer life.

Carefully study out the job. Make sure you do it the safe way. If you are puzzled, ask your boss. Remember, a moment spent findin' out the safe way is better than spendin' hours in the hospital.

Inspect your gloves for air leaks. It's mighty inconvenient and embarrassin' to take hold of some "hot stuff" and all of a sudden find out yer got on a leaky glove.

Do not drop equipment, which has been removed, to the ground. Lower it with a hand line. It doesn't take much more time an', anyway, a little time spent doin' a job safe might save yer buddy a long stretch in the hospital.

Electrical apparatus and all foreign wires should be regarded as "hot." You wouldn't pick up a cobra 'cause you know they're deadly. Well, why'n deuce risk your life messin' 'roun foreign stuff?

Nails and tacks in a pole should be removed whenever found. It's a little point, but, Buddy, a nail or tack in a pole can cause some bad scratches and even serious falls.

Test and make sure that the pole is in good condition before you climb. It ain't much fun ter ride a dern pole to the ground, only ter find that yer on the bottom when it hits ground!

Safety rules followed by you an' I will help ter reduce the great number of accidents.

Well, that's enuf signals fer this time. Don't forget them, and practice them from now on.

So long, Buddies! Hope ter see you next week, and find yer as well an' happy as you are now. Drop me a line once in a while. I'm always glad to hear from you.

New Connections in Vienna Total 5,000 in Ten Months.

In the first 10 months of this year 5,000 requests were received for new telephone connections in Vienna, Austria, according to a report to the Department of Commerce by United States Assistant Commercial Attache D. F. Spencer, Vienna.

The Vienna telephone system has been brought so much up-to-date that new applicants can be attended to within a week in any part of the city, installations being made as they come in. The figure of 5,000 does not compare over-favorably with 8,000 new installations reported for 1930, and it would appear that the general economic crisis is affecting the progress of telephone communications there too.

Reminiscences of an Operator

Chief Operater Recalls Her First Experience in Operating When She Was Placed at the Board to Learn by Trial and Error After Pointers from an Operator of Only Two Week's Experience

By Miss Geraldine Cleaver,

Chief Operator and Bookkeeper, West Iowa Telephone Co., Anita, Iowa

What a change has taken place in the telephone business during the past 10 or 15 years! We are proud of this change, for it is a marked change for the better.

How well I recall my initiation into the telephone business. I had been called home to Anita from college by the illness and subsequent death of my brother, and was unable to finish my college course. A short time later, as I was walking down Main street of this little town in northern Iowa, a girl friend came running up to me.

"Papa wants to see you," she announced breathlessly. Now, "Papa" was none other than Ward Ferguson, who is the grand keeper of records and seals of the Knights of Pythias order in Iowa and is now living in Des Moines. At this particular time Mr. Ferguson was connected in some way with the local telephone company, along with his many other duties.

I went right up to his office and he asked me if I would like a job in the telephone office. Well, I hardly knew whether I did or not. I wanted a job all right but telephone offices did not have a very good name.

After due consideration, I said I would try it. He told me that for various reasons they were letting a couple of girls off and that they needed a new girl right away, so I could report for work that afternoon. Of that conversation I remember only one sentence, the very last thing he told me before I left his office.

"Geraldine, remember the old saying, 'A soft answer turneth away wrath.'" Somehow I always associate that day and that remark with Ward Ferguson. I do not know how often he practices it but it certainly is the safety valve for operators and very true in most every case.

The telephone office was upstairs over a meat market. I had never been in that office, or in any other telephone office. I had no idea what a switchboard looked like and not even the faintest idea as to how it was operated.

That afternoon I went up to the office. There over by the window was the switchboard and sitting in front of it was a girl. What that girl was doing did not mean anything to me for it was all so new. The operator greeted me and told me to come on in, put on the headset, which was hanging nearby, and take the place beside her.

This operator had been working for the telephone company two weeks, so she told me, and was now going to try to teach me how to operate. She told me practically all she knew about operating, which was simply what she had picked up herself in the past two weeks. It did not seem to make much difference whether you answered with the front or back connection, just so you got them answered eventually, nor what you said, or how. I shudder when I think of what the subscribers must have suffered in those days.

The switchboard had one of those mouthpieces on it that hung from a rod at the top of the board. When you answered anyone, you had to chase the mouthpiece from one side of the board to the other. That was the least of my troubles, however.

The one incident that stands out vividly in my mind, in connection with that first afternoon's experience, was the time when I rang the same subscriber in the ear three times in succession, and the "calling down" I received for doing so. I did not know enough to know why or how I had rung her in the ear. I marvel that any of them had any ears left.

From the minute I sat down at that board, I started working. I was given regular hours and was supposed to be an operator. The poor girl with me that first afternoon, and every day after that, scarcely knew anything about operating. I was left alone at the board before I even knew one toll line from another. A line rang in and plugging in I yelled "Hello."

"Who are you?" I heard some one say, from what sounded far away.

"This is Geraldine Cleaver," I yelled back, and as I yelled it I thought it was none of her business who I was. Later, of course, I learned that it was a toll line.

Miracles do happen, and I eventually got so I could operate without ringing everyone in the ear and committing many other blunders. And I vowed that if it ever fell to my lot to train a new girl, she would be trained far differently from the way I had been. I wasn't trained; I simply went to work, much to the sorrow of the subscribers.

After a few months Miss Anne Barnes came to our office and got us straightened out. She gave us some valuable instruction and advice, which we tried to follow in our local practice and pass on to the new operators as they came in. I particularly remember her telling us that "Hello" meant nothing, and she got us started saying "Number?" instead. She taught us, among other things, how to say "Number?"

It takes time to produce a change in anything. It has taken time and work and patience to make the marked change for the better in telephone offices.

Today, girls, realizing that we want only the best in our offices, are anxious for positions in the telephone office. More care is taken in the selecting of operators and in the training. A girl today is given sufficient training and preparation in the average office before she starts to work. We do not wish the public to suffer just because a new girl is on; the work must go on just the same. In order to do this, the girls are trained and supervised in order to avoid as many blunders as possible.

A few years ago the telephone office was a noisy place. The girls could be heard practically yelling "Hello" or "Number?" clear out on the street. The girls read, did fancy work, drank pop, ate their meals; in short, they did almost anything they wished while on duty, and the work could not help but suffer.

I do not believe that the subscribers in those days complained very much about their service (considering the cause they had for complaint), for they knew no different. Today, when a complaint comes in, we know that the subscriber is used to good service; and when he doesn't get it, for some reason or other, he misses it and immediately tells us about it, knowing that every effort will be made to remedy the trouble.

Today the telephone office is a quiet and a dignified place. Happy, satisfied girls are giving efficient service and are enjoying their work.

BREAD, BUTTER AND CLOTHES

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Many years ago, a small boy living in Hocum was thought to be destined to come to some bad end, according to popular belief of Hocumites. No, he did not steal, lie, run away from school, nor torment the neighbors' pet cats. But Aunt Maggie, with whom he lived, a very religious woman, once found his nightly prayer hung on a post at the foot of his bed. Eddie tried to explain to her that he became too sleepy to remember the long prayer she had taught him, so thought this a very good idea.

"A very good idea! You lazy boy," scolded Aunt Maggie. "You'll come to no good end." Then she reminded him of the lazy, good-for-nothing father who had deserted him. "And I've had to care for you, feed and clothe you, and all that," she finished.

Needless to say, Aunt Maggie lost no time in telling the neighbors. They in turn told their neighbors and so on. "Poor Maggie, what a trial Eddie must be, traveling in his father's tracks already," someone would remark as Eddie went by whistling, as though he were not the talk of the town, and a great burden to his Aunt Maggie.

On Sunday, when the neighbors gathered together on the church lawn after services for a little visit, someone was always sure to ask Aunt Maggie, "Where's Eddie?" as though it were an unusual thing not to see him there. "He is home. He is just like his father about church," she would dolefully complain. The neighbors would sigh, shake their heads, and think of that prayer of Eddie's.

If someone had told Aunt Maggie she was doing Eddie more real harm with her conception of religion, which was full of tears, fears, and forebodings, than if she had beaten and starved him, it would have been the truth.

No one can live within an atmosphere solely his own. It is bound to touch and influence the lives of others, for better or worse. How careful we should be in all that we say and do.

One morning while eating breakfast we were entertained with an organ recital by Jesse Crawford. The music was recorded on a phonograph record and sent to us from New York by radio. Although Jesse, no doubt, was quietly sleeping in his bed miles from the broadcasting station, I forgot about the phonograph record and visualized him sitting at his pipe organ rendering his glorious music message to the world.

Jesse Crawford was once a little fellow like Eddie. Perhaps he had a better start in life; nevertheless, I wonder if he got sleepy at prayer-time? If he would have done what Eddie did had he thought about it? If so, then I believe that God forgot that Eddie's prayer was written on paper, even as I forgot that Jesse's beautiful music was coming to me on a phonograph record.

MORAL: Since home is the first and most important school for character building, Eddie had a mighty slim start in life, even though he did get bread, butter and clothes.

Answers to Traffic Questions Presented on Page 20.

1. If a call is passed by address name and the Inward operator knows the number, or if it is posted at her position, she will say: "The number is — (number)." If she is unable to supply the number, she will say: "I will give you Information," and connect you with Information.
2. In all cases where we are permitted to hold the calling party on the line, the time allowance is three minutes with the exception of an NC condition; in this case we hold the calling party one minute while we attempt to secure a circuit.
3. The chief operator is primarily responsible for the accuracy of the peg count. The supervisor is responsible for the accuracy of the peg count in her division, and each operator is responsible for the accuracy of the peg count at her position.
4. When we ask the TTC to "change the connection and ring the called number"; if the calling party is on the line he hears the preliminary report of "DA." If the calling party is not holding the line, we wait until we receive the confirming report of "DA" before giving him a report.
5. If the calling party wishes to talk from another station and also wishes to have the call charged to the other station, we enter, "rec'd — (number of calling station)" in the "Special Instruction" space. We enter "— (number of other station)" in the calling telephone number space.

Telephones Ma
Modern

Above are shown four other styles of Automatic Electric telephones, all utilizing Bakelite in their construction.

THE graceful, moulded lines and beautiful satin-like finish the Monophone are apparent at first glance. Yet th modern styled telephones are durable and rugged to a h degree, and give long years of reliable service with a minim of maintenance expense.

This highly desirable combination of strength with beauty made possible in the Monophone, as well as in other telepho manufactured by Automatic Electric Company, by the use Bakelite. This material is capable of being moulded in artis and graceful shapes, its lustrous finish lasts throughout the of the instrument, it is highly dielectric, and it combines li weight with unusual strength.

When you next buy telephones, either for new installations for replacement purposes, why not try Automatic Electric struments? Subject them to the most rigorous tests—you find them superior in every respect.

Catalog and prices on request.

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The Monophone exemplifies in both its appearance and performance the age in which we live. In it beauty is combined with convenience, reliable operation with durability, and excellent transmission with long life. Furnished in standard black and other colors.

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Automatic Telephone Manufacturing Co., Ltd., Liverpool
The New Antwerp Telephone and Electrical Works, Antwerp
Eugene F. Phillips Electrical Works Limited, Montreal

Telephone News From Foreign Lands

England's Telephones Increasing—Telephone Operation in French Indo-China Unprofitable—Extension of Long Distance Service in Paraguay, S. A.—Use of Pay Stations by Charge Service in England—Japan Installations Decrease

Latest Statistics Show England's Telephones Gradually Increasing.

The total number of telephones in the British Post Office service on July 31, for which date statistics are now issued, was 2,006,040. This represented an increase since the corresponding day of the previous month of 1,992 telephones, of which 1,481 were in the provinces, and 511 in London.

Call-office stations increased by 267, while 11 more rural railway stations were connected with the exchange system. Toll or long distance calls made in May (the latest month for which statistics are available) numbered 10,322,247, a decrease of 228,482 calls on the total for the corresponding month of 1930. Outgoing international calls in May numbered 45,190, and incoming international calls 49,322, as compared with 48,354 and 51,027, respectively, in May, 1930.

Telephone Systems in French Indo-China Unprofitable.

Each of the five countries in the Union of French Indo-China possesses a "Service des Postes, Telegraphes, et Telephones" constituting a government monopoly of the postal, telegraph and telephone systems, administered by a "Sous Directuer," or subordinate manager placed under the authority of the chief executive officers of the country.

In turn, these local organizations are grouped for administrative purposes into a general service controlled by the "Directeur des Postes, Telegraphes, et Telephones" at Hanoi, as a department of the colonial government responsible to the Governor General.

The receipts and expenditures of the service throughout the country form part of the general budget, which invariably shows a considerable deficit for this department, reports United States Vice Consul W. Everett Scotten, Saigon. This is due apparently to the fact that a large number of unprofitable installations have been made for the benefit and development of the country, to the cost of certain postal lines over which mail must be carried by automobile, and to the length and high maintenance costs of the lines in proportion to the traffic carried and the return therefrom.

In 1929 there were 4,352 kilometers of aerial telephone lines and 784 kilometers of underground lines with a total length of wires of 31,774 kilometers. The number of subscribers was 6,939. The total number of calls in 1929 was 9,550,000 and charges amounted to 488,000 piastres (1 piaster equals approximately $0.392).

Subscriptions are divided into two classes: First, the strictly private installations which only the subscriber and his family, guests, employes, or business associates are expected to use; second, those placed at the disposition of the public, as in hotels, restaurants, etc. For the first class the yearly rate is 60 piasters in the cities of Hanoi, Haiphong and Saigon-Cholon, and 50 piasters in other exchanges.

For the second the rate is 85 piasters in the cities mentioned, and 75 piasters elsewhere. Extensions cost 20 piasters each up to 10 from the same regular installation, 15 piasters each for a number between 10 and 50, 10 piasters each for a number between 50 and 200, and 5 piasters each for any number above 200.

The equipment provided all over Indo-China, the report states, is uniformly an obsolete and usually badly-worn magneto type.

Extension of Long Distance Telephone Service in Paraguay.

It is reported in a communication from Post Wheeler, United States Minister, Asuncion, Paraguay, S. A., that satisfactory progress is being made in the extension of the long distance telephone lines of that republic. On August 1, long distance conversations between Asuncion and Paraguari were inaugurated.

It is hoped that by December the telephone system of Paraguay will be extended to the Argentine frontier at Encarnacion, and that by that time a short extension will have been made to the Argentina long distance telephone system, with the result that Asuncion will be in telegraphic communication with Buenos Aires and the rest of the world.

England Encourages Use of Pay Stations by Charge Service.

When users of unattended telephone booths do not have the exact coins for making a call, the British Post Office will mail the change to them upon the insertion of a larger coin. It is also possible for a person who has a private telephone account to have the charges for such calls added to his account.

There are now so many telephone booths, and the public are using them so freely and in such a varied way, that the question of change, or rather of exact coins, has become a substantial public trouble. The Post Office is meeting the demand more than half way with special enterprise in the matter of toll calls and also telegrams, according to the Manchester (England) Guardian Weekly.

In future a person using an unattended telephone and not having the appropriate coins will be allowed to send a telegram on giving the exchange his name and address and promising to send the money. If he should fail to do so, the recipient of the telegram will be asked to pay the charge. This service may also be charged on private accounts.

"It is thought that, though there may be some slight losses here and there, the extension of business will be worth the risk," the Manchester paper states. "One may surmise that this new credit telephoning and telegraphing will advertise the varied uses of the telephone, and will lead many more people to introduce the service into their homes."

New Telephone Installations Decrease in Japan.

The Department of Communication expects to install 28,000 new telephones throughout Japan during the present fiscal year, reports U. S. Assistant Commercial Attache William S. Dowd, Tokyo, Japan. The majority of these will be in the six larger cities.

Charges have been reduced as follows: Tokyo from Y1,000 to Y900; Osaka from Y900 to Y800; Kobe, Kyoto, Nagoya, Yokoma from Y800 to Y700 (one yen equals approximately 50 cents). In the smaller cities the installation charges range from Y240 to Y530, the reductions being from 40 to 80 yen below the price charged last year.

According to the records as of June 10, when applications were closed, fewer telephones are to be installed this year in Osaka than during any year since 1925. Only 2,815 applications for telephones were received, while estimates had provided for 3,900 installations. Heretofore, as the applications had exceeded the amount of equipment available, numbers were awarded by lot, but this procedure was not necessary this year.

Plans are now being considered to adopt the system used in America whereby applications will be received throughout the year. The former method was to have all applications submitted in June for installations to be made during the coming year. The decrease in new telephones is accounted for by the severe business depression.

Diversity of Investment for Economy

Rent From Two Stores Pays Interest and Upkeep on Investment in Telephone Office As Well As Apartment for Manager in the New Building—Opportunity to Make Use of Valuable Property Results in Profit to Telephone Company

At a time like the present, when telephone companies are hard put to it to show a profit, it may be of interest to those directing the policies of their respective companies to learn the experience of the Pike County Telephone Co. of Pittsfield, Ill., in adding to and stabilizing its revenues by diversity of investment.

The accompanying photograph and floor plan show a building erected during the past summer at Hardin, Ill., housing in addition to the exchange and manager's apartment, two high class stores.

When the Pike County Telephone Co. acquired the Calhoun Telephone Co. three years ago, it happened to acquire with it probably the most valuable lot in this little county-seat town. The lot was located on the paved state road and on a corner where more people pass to and from their homes than any other.

The building housing the exchange was old and poorly adapted to the purposes of a combined exchange and residence. A new building erected solely for exchange and residence purposes would have placed a heavier burden on the telephone revenues than they could support. To secure adequate and desirable quarters for exchange and manager the idea of combining stores, office and apartment was decided upon.

The result from the carrying out of this plan, is that rental from the two stores provides sufficient revenue to pay interest and upkeep on the entire investment and in addition provides heat for the entire building. In other words, this arrangement provides exceptional quarters, rent, and heat free to the telephone system.

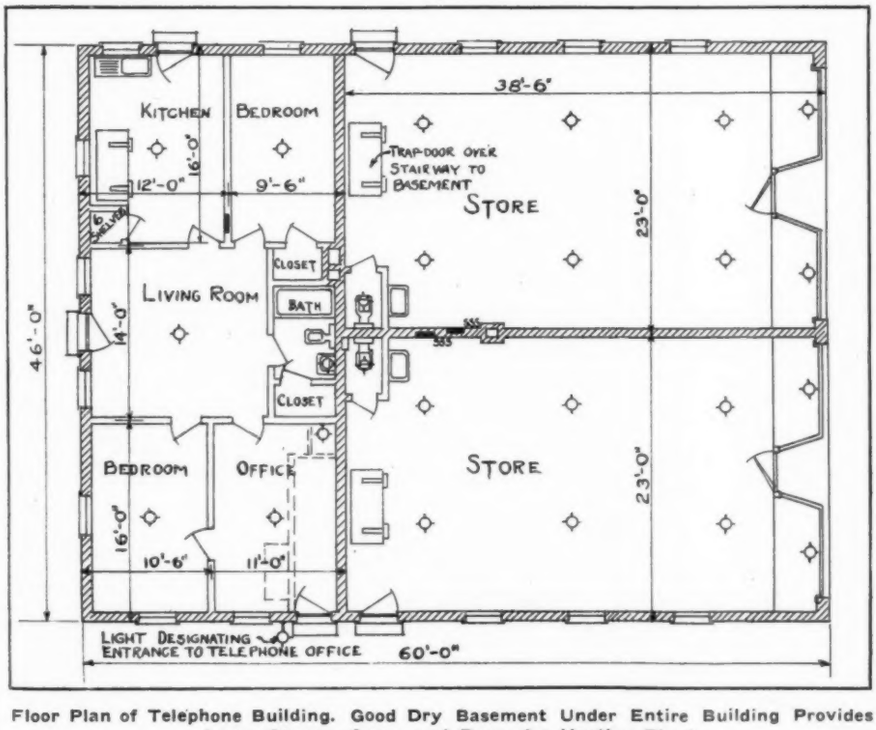
New Building of Pike County Telephone Co. in Hardin, Ill., Showing Stores in Front and Telephone Quarters in Rear. Light Fixture at Left Designates Entrance to Office.

The building is attractively finished in face-brick and the 8½-inch brick partition between the stores and the telephone quarters practically eliminates fire risk.

This particular investment by the Pike County company has proved quite successful. The groceryman occupying one store claims to be doing twice the business he expected to do when first moving in, and the baker occupying the other store is highly pleased. As a result, the company's revenues from this source are quite definitely secured, which is pleasing when other revenues of the company are inclined to slip.

It may be objected that the telephone company is not called upon to support a weak property with other investments, which is true. In fact, if such an investment were injected into an appraisal it might be thrown out in a rate case and most certainly would if it did not happen to be a profitable one. Granting all this, in this year, 1931, when most managers are badly worried about bond interest and other fixed charges, diversity of investment with this company has proved comforting.

The question that this experience might properly suggest, says E. D. Glandon, secretary and manager of the Pike County Telephone Co., is: "What, if any, undeveloped opportunities are there in connection with our business?"



Floor Plan of Telephone Building. Good Dry Basement Under Entire Building Provides Large Storage Space and Room for Heating Plant.

Borrowed Nickel Well Utilized; Telephone Call Obtains Job.

In the Broad Street Station, Philadelphia, one day recently, a man, who disappeared without being identified, returned a nickel he borrowed more than two years ago from Mrs. M. C. Grillis of the Travelers' Aid Society.

The borrowed coin paid for a telephone call—the call netted a job—the job netted an income—the income brought prosperity—and prosperity brought back Mrs. Grillis' nickel plus a box of candy.

Puttingt

CHRISTMAST

Life is complex in the active teens and twenties . . . so much to respond to and dream about! Your daughter will be grateful for a telephone in her room. It makes the room so completely and intimately hers . . . enables her to make dates and exchange confidences with full privacy. And don't forget you:

"DAD HAD MY ROOM DONE OVER . . . AND GAVE ME A

TELEPHONE FOR CHRISTMAS!"

Telephones make pleasing presents to active sons and daughters

You can make this Christmas memorable for the younger generation in your home by providing them with personal telephones. Sons and daughters these days are modern, capable, businesslike. They have interests and obligations of their own. They'll welcome the courtesy and convenience of telephones in their rooms—and enjoy life *more*.

No need to neglect the rest of the household, though! Mother could use a telephone in her boudoir, or on her writing desk, a dozen times a day. Dad deserves one in his den beside the easy chair. Cook can stay close to her busy oven, with a telephone in the kitchen. Fact is, *all* the family will find living so much easier—if they have *enough* telephones!

Why not arrange to have this time-saving, step-saving convenience in your home by Christmas? The local telephone company will advise you on the best type of equipment for your individual requirement. Just call the Business Office—now.

No need to intermingle interesting rumors on a cozy evening . . . with a telephone on the wall of the recreation room!

The sunporch is a pleasant place in winter. A convenient telephone will add to your family's enjoyment of it.

telephones under the TREE . . .

FOR THE first eleven months of this year, full-page advertisements have appeared regularly in national class magazines, stressing the comfort and convenience of the home that has *enough* telephones. They have illustrated convenience photographically, explained its moderate cost, and offered the assistance of the local telephone company in planning it. Many a home owner has read, and pondered, and acted.

In December, this campaign features the advertisement opposite, which directly and definitely suggests telephones as Christmas gifts—particularly acceptable to busy, active young people, but equally welcome to all the family. Appropriate locations are listed and pictured and the time-saving, step-saving features emphasized.

Few gifts are as practical and pleasurable as a personal telephone. This advertisement should help to put ribbon-wreathed telephones under Christmas trees throughout the territories served by Bell and connecting companies.

Advertisement of the American Telephone and Telegraph Company

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Interstate Commission to Determine Authority over Radio Rates.

Charges made by the Sta-Shine Products Co., Freeport, N. Y., furniture polish concern, that the National Broadcasting Co. and Station WGBB of Freeport exacted "unreasonable" rates for the transmission of intelligence for hire in interstate commerce, has raised a question of the jurisdiction of the Interstate Commerce Commission to pass on the complaint, it was stated orally at the office of the chief examiner of the Commission in Washington, D. C., recently.

A hearing scheduled before Examiner Chesaldine in New York on December 14 will be confined entirely to the question of the commission's jurisdiction to regulate radio broadcasting rates under the law as it now stands, it was stated by Ulysses Butler, the commission's chief examiner.

The Sta-Shine Products Co.'s complaint is the first ever filed with the commission involving the question of the commission's jurisdiction to pass upon the reasonableness of rates exacted by radio stations.

The Sta-Shine company in an amended complaint advised the Interstate Commerce Commission on December 5 that, in the complainant's opinion, the National Broadcasting Co. not only is a corporation engaged in the transmission of intelligence for hire by wireless, but also by wire.

Wire connections between chain radio stations and arrangements with telephone companies for the use of telephone wires were cited by the complainant.

The amended complaint reiterates the charge made in the original complaint that the defendants exacted a rate of $146.48 per 15 minutes "for transmitting the said messages through one station and $1,480.49 for so-called 'chain' transmission. All to the great damage of complainant.

"Defendant has failed and refused to furnish facilities for sending complainant's messages at night, although other persons are provided with facilities denied to complainant," said the amended complaint.

"Complainant alleges upon information and belief that defendant National Broadcasting Co. is also engaged in the transmission of intelligence for hire by wire in interstate commerce in that its several wireless or radio stations located in different states are connected by wires over which the said intelligence is transmitted.

"Complainant alleges upon information and belief that defendant National Broadcasting Co. has entered into an arrangement with certain telephone companies for the use of the wires above mentioned and also for the establishing of a through route for the handling of the traffic in intelligence collectively called messages.

"Complainant alleges that no contracts or written documents have been filed with the Interstate Commerce Commission by defendant National Broadcasting Co. as required by law showing what arrangements exist between the telephone companies and defendant for having handled the said traffic, all in violation of the act."

Amended Order Issued in California Property Transfer.

The California Railroad Commission on November 27 issued an order amending its previous decision so as to permit the Ontario & Upland Telephone Co., the Pomona Valley Telephone & Telegraph Union, and the Home Telephone & Telegraph Co., of Chino, Calif., prior to December 31, to transfer and convey all of their properties to the Associated Telephone Co., Ltd.

The amended order further permits the Associated Telephone Co., Ltd., in lieu of the securities authorized by the previous decision, to issue and sell $500,000 face value of its first mortgage 5 per cent gold bonds, series "A," due 1965, at not less than 95 per cent of face value, plus accrued interest; to issue and sell not exceeding 31,604 shares of its common capital stock without nominal or par value at a price of $25.00 a share.

The Associated company was granted permission to deliver the bonds and shares of stock, or the proceeds realized from the sale thereof, in payment for the properties of the Ontario & Upland Telephone Co., the Pomona Valley Telephone & Telegraph Union, and the Home Telephone & Telegraph Co., of Chino, subject to current operating liabilities which may be assumed by the Associated Telephone Co., Ltd.; provided that the issue of $500,000 of bonds and 31,604 shares of stock will be the entire consideration to be paid by the Associated company for the properties as they existed on December 31, 1930, subject to adjustment for current assets and liabilities.

Funds for State-Wide Valuation. Sought by Commission.

The Minnesota Railroad & Warehouse Commission has asked the Minnesota Executive Council for $30,000 to pay the cost of a state-wide telephone valuation. The request was taken under advisement. The 1931 legislature refused to approve an appropriation of $100,000 for similar work.

O. P. B. Jacobson, chairman of the commission, explained that although the commission has a large mass of figures on telephone values, compiled by D. F. Jurgensen, chief engineer, this material is not complete enough for action. He said the additional money would be used to gather supplementary information and complete Mr. Jurgensen's figures.

Charges that the commission is guilty of nonfeasance have been made to Governor Olson by Mrs. Helen O'Brien Kessler, St. Paul, in a petition asking removal of the commissioners. Her petition is based on alleged failure of the commission to secure a reduction on telephone rates, and alleges that the Jurgensen figures are complete and show such a reduction should be made.

San Antonio, Texas, Case Rehearing Postponed to January 11.

The resumption of the rehearing in the federal court of the suit of the Southwestern Bell Telephone Co. against the city of San Antonio, Texas, in the three-year-old rate increase case was postponed on December 1 until January 11.

The reason for this postponement is that Clinton H. Montgomery, consultant for the city of San Antonio, is in New York to review the books of American Telephone & Telegraph Co. and of the Western Electric Co.

Comptrollers of both of these companies testified in the rehearing before Judge Joseph B. Dibrell, special master in chancery, last month. Mr. Montgomery is checking their figures, according to J. C. Quin, utilities attorney for the city.

Missouri Commission Sustains Increased Rate Schedule.

On November 23 the Missouri Public Service Commission issued an order sustaining the increased rates of the Inter-County Telephone Co., operating exchanges in Daviess and DeKalb counties, Missouri. This rate increase went into effect last January and has been the subject of controversy for two years.

The order of the commission was the direct result of a complaint filed by Earl Clark, et al., of Gallatin, Mo., against the Inter-County company. The commission's order held that "the schedule of rates now on file and now being charged by the defendant herein is not excessive and will not produce an unreasonable return."

In sustaining the rate schedule, however, the commission called the attention of the

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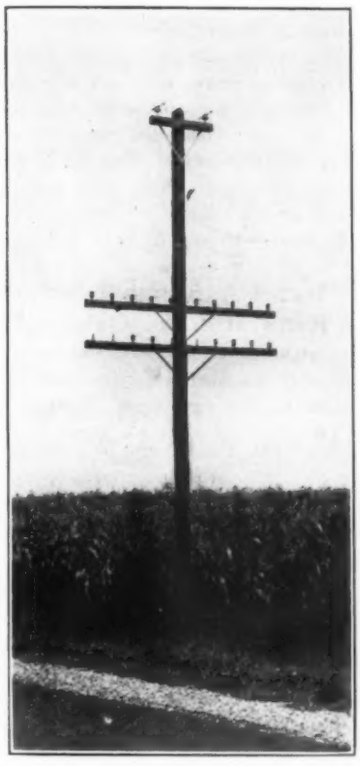

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company to the existing public relations situation with the consequent discontinuance of service by a great many subscribers, suggesting that for the time at least, the maximum service charge has been reached. It is reported that the heaviest withdrawal of service in all the exchanges of the Inter-County company has been from the subscriber-owned rural lines of the Gallatin, Mo., exchange.

Nebraska Companies Campaigning for Teletypewriter Subscribers

The Lincoln Telephone & Telegraph Co. and the Northwestern Bell Telephone Co. have secured permission of the Nebraska State Railway Commission to offer teletypewriter service, and both companies are now making an advertising campaign for patrons. The service is being introduced without rental or installation charges, the subscriber paying only for the amount of service actually used.

As the service is offered, a subscriber's typist simply calls the desired teletypewriter by typing its number and Central immediately makes the connection. In this manner two-way typewritten communications, speed of connection being as fast as telephone service, can be had for any length of time, as short as five minutes or as long as wished.

The new service differs from private line teletypewriter service in that any subscriber may ask for any other like subscriber and be connected immediately. Circulars still further detailing the service are being mailed to those who ask for them, and later a canvass for business will be instituted.

Order Issued Adjusting Telephone Rates at Vern, Okla.

The Oklahoma Corporation Commission on November 30 issued an order approving application of the rates now in effect at Tulsa, Okla., to the Vern exchange of the Southwestern Bell Telephone Co. The order also approved a reduction in the station-to-station rate for toll service between Sand Springs and Tulsa from ten cents to five cents.

The Vern district is now a part of the city of Tulsa and the rate adjustments were agreed to by officials of the Southwestern Bell Telephone Co. The rates were ordered to become effective on and after the next billing date, and not later than December 16.

It Doesn't Pay to Try to Cheat the Telephone Company.

A stranger, in Van Wert, Ohio, who registered under the name of J. C. Fox, aged 38 years, of San Antonio, Texas, was arraigned on November 28, before Mayor T. J. Jones, on a charge of depositing slugs in a pay station booth of the Van Wert Telephone Co.

He pleaded guilty and was assessed a fine of $50 and court costs, which he paid and was released. He paid, also, the sum of $9.60 to the telephone company, to make good the amount owing for calls made by the use of the unauthorized slugs deposited in the pay telephone.

When the man's car was searched, over $200 worth (when used in place of legal coin) of these slugs were found. There was also said to be a bottle of liquor and three forged cashier's checks on the Chase National Bank of New York.

He was held in the county jail on the liquor charge, and it is likely that a forgery charge will be placed against him at the conclusion of the liquor case.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

December 17: Hearing in Washington, D. C., on joint application of the Bell Telephone Co. of Pennsylvania and the Clinton Telephone Co., for authority by the Bell company to purchase the telephone properties of the Clinton company in Lycoming and Clinton counties, Pennsylvania.

CALIFORNIA.

November 27: Amended order issued so as to permit the Ontario & Upland Telephone Co., the Pomona Valley Telephone & Telegraph Union, and the Home Telephone & Telegraph Co., of Chino, prior to December 31, to transfer all of their properties to the Associated Telephone Co., Ltd.

The amended order also permits the Associated Telephone Co., Ltd., to issue certain securities in payment for the properties.

ILLINOIS.

October 27: Western Illinois Telephone Co.'s I. C. C. No. 2, first revised sheet No. 1 (cancelling I. C. C. No. 2, sheet 1) covering rates for service applying to Little York, effective July 1, 1921, filed and no action taken by the commission.

October 27: Patoka Telephone Co.'s rate schedule I. C. C. No. 5, first revised sheet No. 1 (cancelling original sheet No. 1) covering service applying to Patoka and vicinity, effective December 1, 1931, filed. No action was taken by the commission.

October 27: Eastern Illinois Telephone Co.'s I. C. C. No. 1, sheet No. 4, covering rates for service applying to Fisher, Rantoul, Gifford, Thomasboro and Penfield, effective October 1, 1931, filed and no action taken by commission.

October 29: Order approved vacating suspension order affecting rate schedule I. C. C. 2 of the New Milford Telephone Co. covering service in Cherry Valley and vicinity, county of Winnebago, and authorizing the company to place in effect the schedule of rates on file with the commission, effective November 1, 1931, in accordance with provisions set forth in the order.

November 3: Order approved authorizing the Illinois Bell Telephone Co. to modify the terms of payment specified in the original contract covering the sale by the Illinois Bell company to George C. Peterson Co., of certain property in the city of Chicago, in accordance with the terms of the supplemental contract dated September 14, 1931; and approving the supplemental contract; and providing that except as modified or amended by this supplemental order, the order of the commission entered on October 25, 1928, shall be and remain in full force and effect.

November 3: Order approving agreement dated June 2, 1931, between the New York Central Railroad Co. and the Illinois Commercial Telephone Co. relative to the entrance upon the right-of-way and property of the railroad company for the purpose of attaching to and maintaining wires upon telegraph poles of the Western Union Telegraph Co. located upon the property of the railroad company.

November 3: Order approving traffic agreement filed October 23, 1931, between the Illinois Commercial Telephone Co. and the Charlotte Telephone Co., covering the connection of the toll lines of the former with the system of the latter and the joint handling of toll messages.

November 4: Order approved directing the Illinois Bell Telephone Co. to file, by November 7, 1931, effective November 9, 1931, I. C. C. No. 1, being a schedule of rates for denial for non-payment and restoral of service, applying to all its exchanges in the state of Illinois, in the form attached to its petition dated November 4, 1931.

November 18: Harrisonville Telephone Co.'s revised sheet 1 to I. C. C. 5 covering service in Columbia, Dupo, Prairie du Rocher, Red Bud, Valmeyer and Waterloo, filed and no action taken by commission. The schedule includes a charge of 5 cents per message for local exchange service and station-to-station calls between the company exchanges and non-subscribers; also a charge of $3.00 per annum in addition to the regular charge for service for handset equipment, effective December 12.

November 18: Illinois Bell Telephone Co.'s I. C. C. 1, sheets 5-A, filed applicable to its Chicago exchange, contains revised rates for extension line service, effective December 1. No action was taken by the commission.

November 24: Special permission granted application of the Intra State Telephone Co. to file, effective the next day thereafter, I. C. C. No. 1, covering service connection charges and moves and change charges applying to all of its exchanges in the state of Illinois, in the form attached to its petition filed November 21.

November 24: Special permission granted application of the Champaign County Telephone Co. to file, effective November 19, its rate schedule I. C. C. No. 1, sheet No. 2, providing rates for installation and disconnection of telephones at Philo and Tolono.

November 24: North Henderson Telephone Co.'s I. C. C. No. 1 covering service applying to North Henderson and vicinity, effective December 18, filed and no action taken.

November 25: Special permission granted application of the Mt. Auburn Telephone Co. to put in force on one day's notice, the following rates: Installation of telephones, $1.50; moves and changes, $1; charges for reconnection to be annulled.

November 25: Order approved authorizing the Illinois Bell Telephone Co. to execute general joint pole agreements with other public utilities, without the prior approval of this commission in each instance; and after approval of such agreement the company is permitted to sell to and/or buy from the other party, or parties to such contract, such poles or interest in poles as shall be necessary for the equitable division of ownership and responsibility.

The Illinois Bell company was also authorized to bring specific poles under the terms of such general agreement by buying

(*Please turn to page* 41.)

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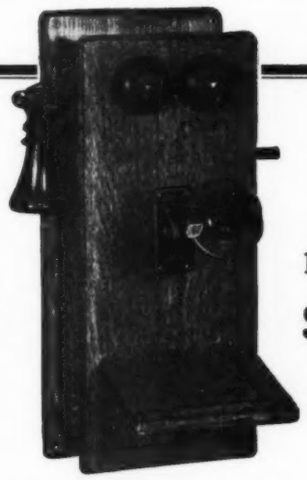

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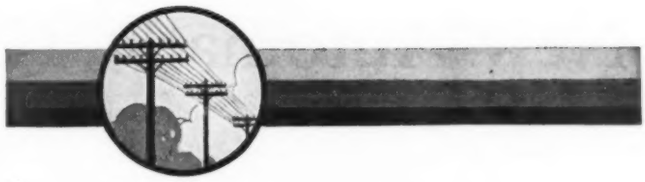

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New Automatic Toll Board Installation

Time-Completion of Toll Calls in Elyria, Ohio, Reduced Considerably Upon Installation of New Automatic Toll Board by Elyria Telephone Co.—Features of Board Include a Neat Appearance and Comfortable Positions for Operators

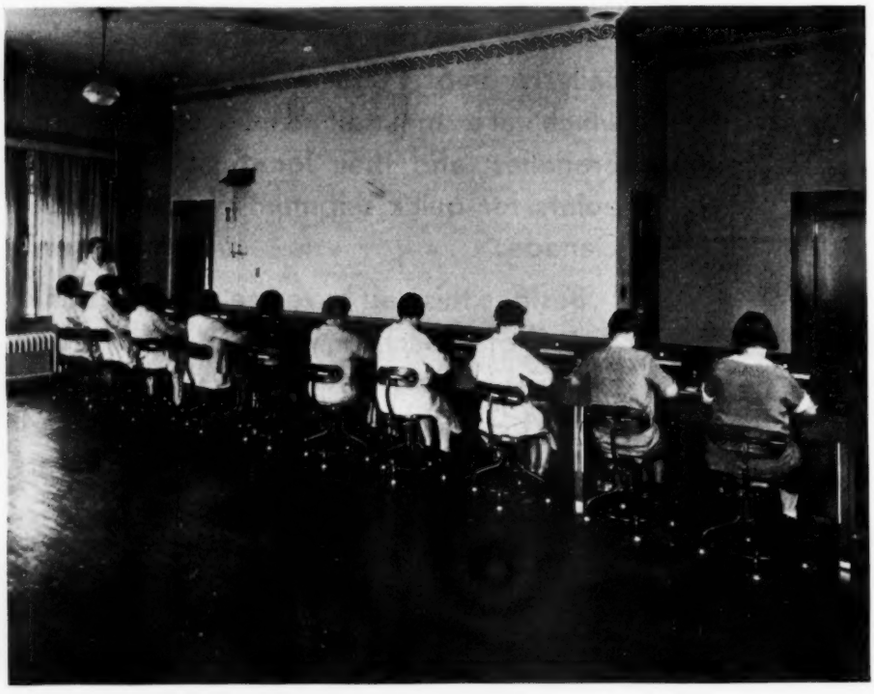
By L. L. Ruggles,
Sales Department, Automatic Electric Inc., Chicago

With the recent cutting into operation of the Elyria Telephone Co.'s new automatic toll board, telephone-users in Elyria, Ohio, now have available for their use the latest development in that type of communication. Incidentally, this installation represents the first large scale, commercial application of this new equipment to be made in the world.

The new Strowger automatic toll board installed at Elyria is considerably different in appearance from the customary type of board. No longer does the toll operator sit before a high bank of flashing lamps, nor does she insert the familiar plugs into the numbered jacks representing the various trunks. Instead, the new automatic board has more of the appearance of a simple writing desk, the rear portion slightly raised to accommodate three or four pigeon-holes in which time-slips, etc., are placed.

The working part of the desk consists merely of a row of keys with associated lamp signals, and, of course, the familiar time-clock mechanism which stamps the duration of the call on the ticket.

Almost all of the functions formerly carried out by the operator herself are now done by automatic switches, leaving the operator free to give more attention to the details of the call itself. From the subscriber's standpoint, this results in immediate advantage. Each call is bound to be more expeditously handled, because the operator can give more prompt and more accurate service.



View of Operators in Position at New Automatic Toll Board in Elyria, Ohio, Showing Comfortable Operating Positions and Absence of Cross-Over or "Cord Reach" Difficulties.

With the new system, 85 per cent of all long distance calls can be completed without the calling subscriber hanging up his receiver. This advantage can be best compared by realizing that under this system a majority of toll calls are completed in an average of 65 seconds, while under the system of dismissing the subscriber, then calling him back to the telephone when the call is completed, the average time interval for completing a call is five minutes.

When a subscriber dials "long distance," there is no waiting with the new system, since his call is automatically routed to the least occupied operator. Speaking technically, this feature greatly reduces "operator's answering time."

Another advantage appreciated by the user is that he deals directly with the operator handling his call. This results in immediate and more satisfactory action when he wishes to change anything relating to his call or wishes information as to its progress.

The clarity of voice transmission is considerably improved, due to the toll connections being established by means of an electrically-operated switch, producing perfect contact. By doing away with cord and plug connections, premature disconnects and interruptions by the operator are eliminated.

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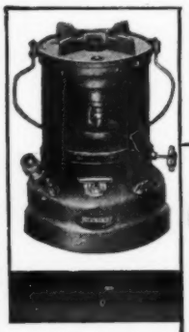

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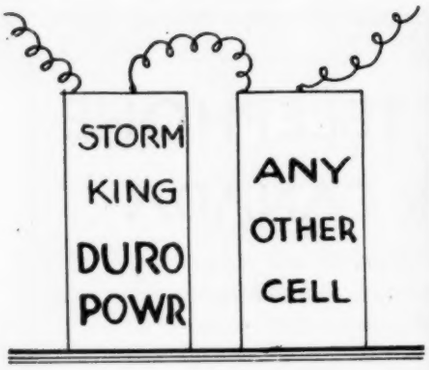

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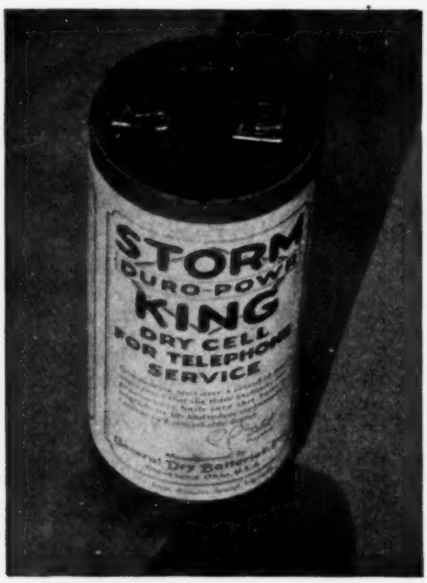


Strowger Automatic Equipment Associated with Elyria, Ohio, Toll Board. These Switches Set Up the Connections with Speed and Accuracy.

since each operator has her own electrically-operated timing device. With the consecutively-grouped manner in which each call is recorded, the operator is much less apt to make a mistake in recording a call as with former methods of operation.

Some other features of this new board are not so apparent to the casual observer but will be noticed and appreciated by the technical telephone man. Certain of these, however, are readily understood by the layman, among which is the more comfortable seating for the operators which the new board makes possible. The standard height and simple arrangement of each position allows the operators to sit comfortably, rather than to conform to the operating peculiarities of the board.

One of the most tiresome of tasks formerly associated with toll operation—"cord reach"—has been eliminated with the removal of cords and plugs. Since every new call is automatically routed to the least occupied operator, it is no longer necessary for all operators to constantly observe a large group of line lamps. All of these various factors have reduced fatigue in toll operation, thus increasing the alertness and capability of each operator.

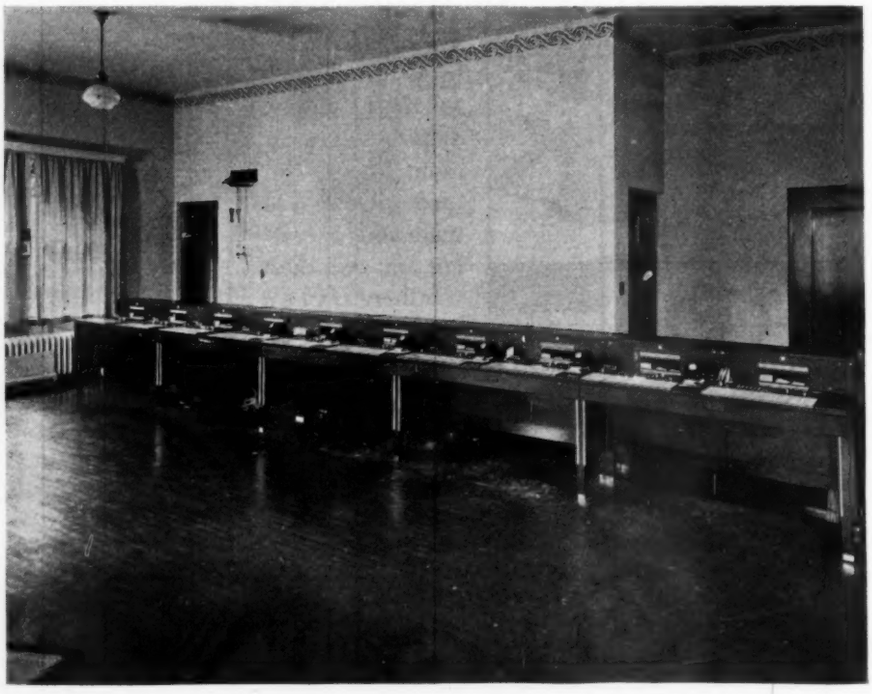
The Strowger automatic toll board is manufactured by Automatic Electric Inc. of Chicago, Ill., which company also manufactured and installed the automatic equipment for the local dial service at Elyria. The new board incorporates all standard toll practices as to its line and recording methods, and requires no changes in distant toll boards with which it connects. It can be used with manual exchanges as well as with automatic exchanges.

Dates for Kansas Convention Set for Next Year.

April 19, 20 and 21, 1932, are the dates selected by the Kansas Telephone Association on which to hold its annual telephone convention. The meeting will be held at the Jayhawk Hotel in Topeka.

Prices in the Metal Markets.

New York, December 7: Copper—Quiet; electrolytic, spot and future, 6½@6¾c. Tin—Easy; spot and nearby, $20.75; future, $21.05. Lead—Steady; spot New York, 3.85c; East St. Louis, 3.65c. Zinc—Steady; spot and future, 3.17c.



This View of the New Strowger Automatic Toll Board Installed at Elyria, Ohio, Gives An Excellent Idea of Its Clean-Cut Appearance and Simple Arrangement.

The Decibel.

Along with the basic equations given it is desirable to consider briefly the unit of telephone transmission—the decibel. The decibel is a very simple unit, and there is no excuse for a telephone man not being familiar with it. It has previously been discussed in the data sheet series, and in articles in Telephony. "DB's or TU's Units of Transmission," by Dr. J. O. Perrine in the March 22, 1930, issue; "The Relation of the Decibel to Circuit Transmission Efficiency," by Harry N. Farris in the July 26, 1930, issue; and "Telephone Circuit Power Measurements," by Arthur L. Albert in the September 26, 1931, issue, may be referred to for even more detailed information. The following explanation may clarify some points regarding this unit.

This unit may be best defined as the "loss or gain resulting where two amounts of power differ in magnitude in the ratio 0.794." That is, if we have an input power of one watt into a telephone circuit, and due to losses in the circuit the output is only 0.794 watt, then the loss is 1 decibel. If we had put into the circuit 1 watt, and taken out 1.259 watts —this could only happen in a circuit in which amplification was present—then we would say that the gain was 1 decibel.

Two outstanding facts of particular interest should be noted about the decibel. First, the unit itself does not

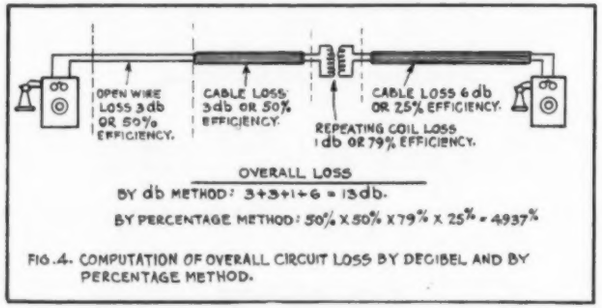

OPEN WIRE LOSS 3 db OR 50% EFFICIENCY.
CABLE LOSS 3 db OR 50% EFFICIENCY.
REPEATING COIL LOSS 1 db OR 79% EFFICIENCY.
CABLE LOSS 6 db OR 25% EFFICIENCY.
OVERALL LOSS
BY db METHOD: 3+3+1+6 = 13 db.
BY PERCENTAGE METHOD: 50% X 50% X 79% X 25% = 4937%

FIG. 4. COMPUTATION OF OVERALL CIRCUIT LOSS BY DECIBEL AND BY PERCENTAGE METHOD.

represent a fixed magnitude, as do other units such as the foot, pound, etc., but expresses a ratio between any two quantities which may be anything such as sound, electricity, money, etc.

Secondly, the unit may be used to express either gains or losses, and if used to express gains the ratio between input and output powers is greater than unity and is the reciprocal of 0.794, or 1.259.

Saying that a circuit has a loss of one decibel is equivalent to saying it has an efficiency of 79.4 per cent. The decibel unit is used in preference to expressing circuit losses or gains in percentages as the unit is logarithmic in character; hence, overall losses of circuits may be obtained by

simply adding the respective losses in decibels of the various component parts of which the circuit is composed.

To obtain the overall loss of a circuit, if the loss of the various parts of the circuit is expressed in percentages, it would be necessary to multiply all the separate percentages together in order to get the overall efficiency. This would be much more inconvenient than by the decibel method wherein the overall loss can be obtained by merely adding the separate losses together. Fig. 7 illustrates the difference in computing overall circuit losses by the decibel method, and the percentage method.

It was previously stated that if two amounts of power differed in the ratio of 0.794, that the loss or gain would be by definition—one decibel—also that the unit is logarithmic.

No. of db.	Power Ratio.	Current and Voltage Ratio.	Power Efficiency in Per Cent.
1	.794	.891	79.4
2	.631	.794	63.1
3	.501	.708	50.1
4	.398	.631	39.8
5	.316	.562	31.6
6	.251	.501	25.1
7	.200	.447	20.0
8	.158	.398	15.8
9	.126	.355	12.6
10	.100	.316	10.0
11	.0794	.282	7.94
12	.0631	.251	6.31
13	.0501	.224	5.01
14	.0398	.200	3.98
15	.0316	.178	3.16
16	.0251	.158	2.51
17	.0200	.141	2.00
18	.0158	.126	1.58
19	.0216	.112	1.26
20	.0100	.100	1.00
21	.00794	.0891	0.79
22	.00631	.0794	0.63
23	.00501	.0708	0.50
24	.00398	.0631	0.40
25	.00316	.0562	0.32
26	.00251	.0501	0.25
27	.00200	.0447	0.20
28	.00158	.0398	0.16
29	.00126	.0355	0.13
30	.00100	.0316	0.10

Relationship Between Loss in Decibels and Power, Current and Voltage Ratios and Power Efficiency

Therefore, the greater the number of decibels considered, the greater the difference between input and output powers. For example, three decibels represent a ratio between input and output powers of 0.50, whereas six decibels represent a difference of 0.25.

To find the number of decibels loss corresponding to the loss or gain between two amounts of power, the following equation is used: $\text{db's} = 10 \log \frac{P_1}{P_0}$

where P_1 = input power, and P_0 output power.

This equation need not scare anyone not familiar with the use of logarithms, for where computations involving power, current, or voltage ratios are necessary, the accompanying table may be used.

It will be noted in this table that the number of decibels corresponding to voltage and current ratios is obtained by multiplying the logarithm of the ratio by 20 instead of 10. This takes into account the squared relation between voltage, current, and power. That is: $\text{db's} = 20 \log \frac{I_1}{I_0}$ or

$$\text{db's} = 20 \log \frac{E_1}{E_0}$$

The Standard Reference System.

Although the decibel does not of itself express a fixed magnitude of anything tangible, as do most other units, but in telephone work it is referred to what is known as the "standard reference system" and thereby may be used to represent a given voice level.

This standard reference circuit consists of two common battery circuits connected together and fed by 24-volt battery. The elements used in the subscriber set circuits are Western Electric No. 229 transmitters, No. 122 receivers, and No. 20 induction coils.

When talking from one subscriber set to the other in a normal tone, the voice level heard in the listening subscriber set is referred to as zero db level. A reference level in terms of the decibel unit is thus established. Having established a reference level it is then possible to prescribe a transmission standard for toll and local calls. These standards are approximately 30 decibels for toll and 20 decibels for local calls; that is, the maximum loss must not be greater than that set up by the standards.

By reference to the decibel table it will be seen that the voice level heard on a toll call where the overall loss was 30 db, would be about 1.0 per cent of that heard over the standard reference circuit, and on 20 db local calls 10.0 per cent of that heard over the standard reference circuit.

Future data sheets will discuss how transmission equivalents of circuits and equipment are measured, using various types of measuring equipment.

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MANUFACTURERS' LITERATURE

The following is a brief description of recently published bulletins, catalogs, etc. If you are interested in obtaining copies address your request to the manufacturer.

Notices Not Previously Published

MOTORS (Electric)

Bulletin 230, describing small D. C. motors; Bulletin 831, describing small A. C. motors; Bulletin SR-131, describing motorized speed reducers; Bulletin 431-R, describing rotary converters. **Janette Manufacturing Company, 556-558 W. Monroe St., Chicago, Illinois.**

POLE SPECIFICATIONS

A 16-page pamphlet containing complete specifications for Southern Yellow Pine poles as prepared and approved by American Standards Association. Supplemented by one 4-page folder containing information relative to the basis on which the new specifications were prepared, and another 6-page bulletin giving a graphic comparison of the existing specifications against the specification proposed by the American Standards Association.

Notices Previously Published

CLIMBERS

16-page booklet illustrating and describing climbers, straps, pads, tool belts and safety straps for linemen. **W. H. Buckingham, 503 State Street, Binghamton, N. Y.**

MAGNETO EQUIPMENT

New 72-page general catalog prepared expressly for magneto exchanges. It completely covers all necessary equipment, apparatus, and supplies for magneto plants. **Kellogg Switchboard & Supply Company, 1066 West Adams Street, Chicago, Ill.**

POLES

A 16-page illustrated booklet entitled, "Termites—A Growing Menace to Untreated Timber." **Ayer & Lord Tie Company, Railway Exchange Bldg., Chicago, Ill.**

POLES

"Handbook of Practical Information About Cedar Poles and Butt-treating," is the title of a 40-page, illustrated book now available. **Page & Hill Company, Minneapolis, Minn.**

RINGING CONVERTERS

Bulletin No. 150 entitled "Leich Ringing Converters" describes and illustrates converter equipment for producing ringing current; this includes harmonic converters, ringing frequency converters and ringing converters with charger equipment. Leich Electric Co., Genoa, Ill.

SALES CAMPAIGNS

Two Small Folders specially designed for extension sales campaigns are now available. They will be furnished complimentary all ready for insertion with your monthly bills—they can be obtained in any quantity required. American Electric Company, Incorporated, State & 64th Streets, Chicago, Illinois.

SWITCHBOARDS (P-A-B-X's)

The Strowger Type 32 P-A-B-X has a capacity of 6 local lines and 2 central-office trunks, and provides facilities for handling trunk calls at any station, thus eliminating the attendant's cabinet. It is described in an illustrated circular, recently published. **Automatic Electric Inc., 1033 W. Van Buren St., Chicago.**

WOOD PRESERVATIVE

An eight-page booklet entitled, "ZMA for Wood Preserving," regarding the different uses of ZMA wood preservative. **Curtin-Howe Corporation, 405 Lexington Ave., New York City, N. Y.**

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WHAT THE COURTS AND COMMISSIONS ARE DOING.

(*Continued from page* 34.)

or leasing from and/ or selling or leasing to the other party or parties poles or interest in poles or space therein, in the manner and under the terms of the general contract so approved, upon conditions set forth in the order.

November 27: Approval given applications of the following companies asking for permission to reduce rates for service connection and move charges:

Illinois Telephone Co., Jacksonville; Boynton Telephone Co., Pleasant Plains; Home Telephone Co., Bluffs; Automatic Home Telephone Co., Pontiac; Streator Telephone Co., Streator; and the Illinois Valley Telephone Co., Bushnell.

INDIANA.

November 27: Order issued dissolving the Intercommunications Corp., a holding company of toll properties of a number of northern Indiana telephone companies for which the United Telephone Co., Inc., is the holding company. Properties ordered returned to the original companies are the Central Lakes Telephone Corp., Communications Relay Corp., Intercommunications Corp., Interstate Radio Corp., Jay County Telephone Corp., Johnson County Telephone Corp., Kosciusko County Telephone Corp., Miami-Wabash Telephone Corp., Newton and Benton County Telephone Corp., Pulaski County Telephone Corp., St. Joseph Telephone Corp., and the Winona Telephone Corp.

The order also gave the United Telephone Cos., Inc., the authority to buy all the companies affected. The case arose out of an investigation last spring of the Interstate Telephone & Telegraph Corp. to bring out the relations it had as the holding company for the other companies.

KANSAS.

November 24: Petitions from the Armourdale Civic Association of Kansas City and from 441 residents of Oberlin filed asking investigations and reductions of existing telephone rates.

MINNESOTA.

December 1: In the matter of the complaint of Peter Pichotta and Harvey E. Countryman, both of Boy River, relative to paying switching fee for two centrals and a raise in the rate for switching service by the Remer Rural Telephone Co. at Boy River, Cass county; the commission ordered the Remer Rural company to refund to each subscriber the amount paid in excess of the authorized rate of 25 cents from date of May 1, 1931, when raise was placed into effect on the Boy River line and from July 1, 1931, when it became effective on the Rogers line, without proper authorization.

December 21: Hearing postponed from December 2 on petition of O. B. Sillerud, et al., filed April 8, and the petition of Alexander Small, et al., filed May 23, requesting an investigation as to the reasonableness of the present rates of $21.00 per year gross, or $18.00 net, for rural metallic circuit telephone, and $18.00 per year gross, or $15.00 net, for rural grounded circuit telephones as charged by the Pelican Telephone Co.

MISSOURI.

November 18: Approval given joint application of the Scotia Telephone Co. to sell and the Southeast Missouri Telephone Co. to buy certain property located at Advance, Fisk, Marble Hill, Marquand, Patton, Puxico and Qulin, Mo.; and Pollard, Ark.; toll lines between Advance and Marble Hill; Marble Hill and Patton; Leora and Bloomfield; Poplar Bluff and Puxico;

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WE'LL GO DOWN A COUPLA STREETS AN' I'LL GIVE YOU A DEMONSTRATION!
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NOT SO LONG AGO ONE CABLE SUPPLIED ALL TH' TELEPHONES IN THIS NEIGHBORHOOD—
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ON TH' SAME STRAND WITH TH' LITTLE RING WE HOOKED ON AN EXTRA LONG CABLE RING AN' HUNG ANOTHER CABLE AN' WE'RE ALL SET WITH NO TROUBLE

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Patton and Sedgewickville; Puxico and Advance via Leora; Zelma and Advance; Fisk, Mo., and Piggott, Ark.

November 30: Application of the Clinton County Telephone Co. for authority to issue $70,000 of its first mortgage bonds filed.

NEBRASKA.

December 2: Application of the Hershey Telephone Co. for authority to increase rates on certain lines, denied.

December 2: Application of the Petersburg Telephone Co. for authority to increase rates, denied for lack of evidence and dismissed for want of prosecution.

December 2: Formal complaint of the board of trustees of the village of Stella against Southeast Nebraska Telephone Co., alleging discrimnatory rates between Stella and other named exchanges of the company dismissed at the request of the complainants.

NEW YORK.

December 7: Transfer of the Perrysburg Telephone Co., operating in Perrysburg and Dayton, Cattaraugus county, to the New York Telephone Co., authorized.

NORTH DAKOTA.

October 29: Farmers Mutual Telephone Co. filed a reduced schedule of telephone rates applicable in Lunds Valley.

November 3: Application filed by the Kathryn Telephone Co. asking for authority to discontinue service at Kathryn.

November 16. Approval given the reduced schedule of rates filed by the Farmers Mutual Telephone Co., of Powers Lake.

November 16: Application of the Northwestern Bell Telephone Co. asking for permission to discontinue its exchange at Kief approved.

November 21: Approval given original sheet 1 supplement to section 15 of the general supplemental rate schedule filed by the Northwestern Bell Telephone Co.

November 23: The second revised local exchange tariff which the Northwestern Bell Telephone Co. filed applicable to Anamoose, approved.

November 25: Approval given the first revised local exchange tariff filed by the Northwestern Bell Telephone Co. applicable to McClusky.

November 28: Western Union Telegraph Co., of Bismarck, filed timed wire service rate applicable between points in the state.

OKLAHOMA.

November 30: Order issued adjusting telephone rates at Vern as charged by the Southwestern Bell Telephone Co.

December 11: Continued hearing from November 30 on complaint of the city of Poteau against the Oklahoma-Arkansas Telephone Co. asking for reduced rates.

Associated Telephone and Telegraph Company
100 West Monroe Street
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DIVIDEND NOTICE
The Board of Directors of Associated Telephone and Telegraph Company has declared the regular dividend of $1.75 per share on the 7% First Preferred stock; $1.50 per share on the Six Dollar First Preferred stock; $1.00 per share on the $4.00 Preference stock; and $1.00 per share and an additional and participating dividend of 50c per share on the Class A stock for the quarter ending December 31, 1931, payable January 1, 1932, to stockholders of record at the close of business December 17th, 1931.
R. J. MUNRO, Secretary.

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New Telephone Companies and New Incorporations.

SPRINGFIELD, ILL.—The Illinois Home Telephone Co., Jacksonville, Ill., has been granted a charter of incorporation by Secretary of State William J. Stratton, to take over the Illinois Telephone Co., of Jacksonville. It was authorized to issue $500,000 preferred stock and $1,750,000 common stock. Offices will be in Jacksonville. The new incorporation effects reorganization and reconstruction of the capital structure of the company it succeeds.

J. H. Dial, Jacksonville, one of the incorporators of the company, is vice-president and general manager of the Illinois Telephone Co. and E. R. Cogswell and H. G. Lankford, Chicago, other listed incorporators, are with the Illinois Bell Telephone Co. Other incorporators are E. E. Crabtree and F. B. Insley, Jacksonville; J. G. Crane and H. M. Cox, Kansas City, Mo.; V. E. Chaney, Chicago, and Carson P. Metcalf, Greenfield, Ill.

The company serves Alexander, Carrollton, Greenfield, Hillview, Literberry, Manchester, Murrayville, Patterson, Roodhouse, White Hall, Winchester and Woodson.

SANFORD, N. C.—The Heins Telephone Co. has been incorporated by E. C. Heins with a capital of $250,000.

CHEWELAH, WASH.—The Chewelah Telephone Co., incorporated with a capital stock of $10,000, has filed an amendment increasing its stock to $30,000.

Financial.

MONTREAL, QUE., CAN.—The Bell Telephone Co. of Canada has declared its regular quarterly dividend of $2.00 payable January 15 to stock of record December 23.

Elections.

FAIRVIEW, ILL.—At the annual meeting in November of the Fairview Central Telephone Co., the following officers were elected:

President, Hays Schleich; secretary, R. E. Gould; treasurer and manager, Jerome Lawson. The regular committees were appointed by the president. The financial report showed the company to be in very good condition.

Construction.

SUMMERVILLE, GA.—Extensive improvements are to be made in the local telephone system at an early date, it is stated. R. C. Higgins, of Asheville, N. C., representing the owners of the local system, is here to supervise the work.

It is said a new switchboard will be installed, a new cable put up on Main street and all other lines of the company given necessary attention.

FAIRVIEW, ILL.—During the past year, the Fairview Central Telephone Co. carried out many improvements in its local system and all the lines are now underground in Fairview. The company serves a total of 380 telephones.

NEW TROY, MICH.—The Citizens Telephone Co. is now installing a 50-pair cable which will extend about one-half mile at the present. The cable will be extended in the future to Bridgman as rapidly as business conditions permit, the company states.

ROCHESTER, N. Y.—Approval of an $8,000 expenditure for the erection of a central office in Honeoye Falls has been voted by directors of the Rochester Telephone Corp. The structure is expected to be completed before next spring.

Miscellaneous.

BIRMINGHAM, ALA.—A reward of $50 has been offered by the Southern Bell Telephone & Telegraph Co. for apprehension of thieves stealing pay-station telephones in the city. The reward was offered after more than a score of telephones were reported recently stolen in all parts of Birmingham.

CHICAGO, ILL.—The Telephone Bond & Share Co. has acquired all of the controlling stock in the Fairmont Telephone Co. of Fairmont, Minn., with about 2,000 subscriber stations. The company operates exchanges in Fairmont and Ceylon, Minn.

RAYMOND, ILL.—The Illinois Consolidated Telephone Co. recently moved into its new exchange building here.

DAVENPORT, IOWA.—The Princeton Telephone Exchange, owned and operated by Ida E. Fulton, was recently sold to Charles E. Grove for $1,000, according to a bill of sale filed in the office of County Recorder A. E. Lindquist.

FALMOUTH, KY.—Miss Winifred Broderick, who has been connected with the Citizens Telephone Exchange for a number of years, has been promoted to manager of the exchange to fill the vacancy made by the resignation of Miss Carrie Norris.

SUTHERLAND, IOWA.—The Sutherland Telephone Co. here has been sold to the West Iowa Telephone Co., of Remsen. The transaction was made by means of a cash payment and by obtaining stock in the purchasing company.

ST. MARYS, OHIO.—The St. Marys Telephone Co. has moved into its new modern fireproof building here but the cut-over to the new equipment is not expected to be made until about January 15.

TOLEDO, IOWA—An expenditure of approximately $10,000 is being made here by the Central Iowa Telephone Co. in rehabilitating its outside plant equipment. The present aerial wire leads are being replaced with cable. When the work is completed all circuits will be metallic, it was stated by General Manager J. M. Mitchell.

Eight to ten men are being used in the work and their time will be occupied in the improvement during the major part of the winter.

LIVINGSTON, WIS.—The Annaton-Preston Telephone Co. has taken over the Grant County Telephone Co. and has installed new equipment, it is reported.

RACINE, WIS.—Fifteen telephone poles valued at $90 were taken from the Wind Lake Telephone Co. near Racine a short time ago. The poles weighing 125 pounds, were placed on the highway preparatory to the installation of a new line.

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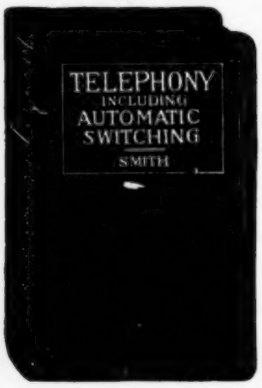

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Cook No. 100 (per line)	.85
Cook No. 105 (per line)	1.50
Cook No. 60 (per line)	.50
Cook No. 14 (new), (per line)	.60
Automatic Elec. Co. D-67500 (new), (per line)	.75
Automatic Elec. Co. D-67500 (rebuilt), (per line)	.50
Western Electric Co., No. 1168-A (per line)	.65
Western Electric Co. No. 1169-A (per line)	.65
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